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INDO-EUROPEAN AND AFROASIATIC:
NEW EVIDENCE FOR THE CONNECTION

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0. PREFATORY REMARKS:

The primary purpose of this paper, which is divided into four parts, is the demonstration that Indo-European and Afroasiatic bear a stronger affinity, both in their vocabulary and in their phonological systems, than could possibly have been produced by accident; so strong indeed, that no linguist could examine them without believing them to have sprung from a common source: there is a similar reason, though not quite so forcible, for supposing that both Indo-European and Afroasiatic are merely two branches of a larger macrofamily¹; however, only Indo-European and Afroasiatic will be considered here.

The first part of this paper deals with the reconstruction of the Indo-European phonological system, the second part with Proto-Semitic, the third part with a comparison of the Indo-European and Semitic phonological systems and vocabularies, and the fourth part with a sketch of the prehistoric development of the Indo-European phonological system. The first two parts are merely a review of the current literature, and detailed discussion is mostly avoided. However, abundant references are given, and these should be consulted for details.

¹I am, of course, paraphrasing the now famous third anniversary discourse made by Sir William Jones before the Asiatick Society (of Bengal) on 2 February 1786.

1. THE RECONSTRUCTION OF THE INDO-EUROPEAN PHONOLOGICAL SYSTEM²:1.1. *The Neogrammarian System:*

The attempted reconstruction of the Indo-European phonological system has had a long history. The first steps were taken in the middle of the 19th century. Then, with each new generation of scholars, a series of brilliant discoveries were made in rapid succession. By the end of that century, the phonological system reconstructed by the Neogrammarians (most notably Karl Brugmann) was widely accepted as being a fairly accurate representation of what had existed in Indo-European. To this day, the Neogrammarian system commands a great deal of respect and has many defenders.

The Neogrammarian system consists of a four-way contrast of plain voiceless, voiceless aspirated, plain voiced, and voiced aspirated stops (cf. Brugmann 1904:52). This system is extremely close to the phonological system of Old Indic (cf. Mayrhofer 1972:17). It should be pointed out that, in spite of its wide acceptance, a small group of scholars has, from time to time, questioned the validity of the Neogrammarian system, at least in part (for a discussion of some of the opposing views, cf. Hopper 1977b:57-72 and Szemerényi 1972:122-36).

The Indo-European phonological system as reconstructed by Brugmann (1904:52) sums up the views of this period:

Monophthongs:	a	e	o	i	u	ə			
	ā	ē	ō	ī	ū				
Diphthongs:	ai	ei	oi	əi		au	eu	ou	əu
	āi	ēi	ōi			āu	ēu	ōu	

²The sections of this paper dealing with the reconstruction of the Indo-European phonological system are, in large part, condensed from my article entitled "The Indo-European Phonological System: New Thoughts about its Reconstruction and Development" (*Orbis*, XXVIII/1, 1979).

Syllabic Liquids and Nasals:

Syllabic Liquids and Nasals:					r	l	m	n	ṛ	ṛ̃
					ṛ̃̃	l̃̃	m̃̃	ñ̃	ṛ̃̃̃	ṛ̃̃̃̃
Occlusives:	p	ph	b	bh	(labial)					
	t	th	d	dh	(dental)					
	ḱ	ḱh	ǵ	ǵh	(palatal)					
	q	qh	g	gh	(velar)					
	q ^u	q ^u h	g ^u	g ^u h	(labiovelar)					
Fricatives:	s	sh	z	zh	ʃ	ʃh	ð	ðh		
Nasals:	m	n	ṇ	ṇ̃						
Liquids:	r	l								
Semivowels:	i	u								

1.2. *The System of Lehmann:*

The evidence for the existence of voiceless aspirates in Indo-European is extremely slight, coming almost exclusively from Indo-Iranian (cf. Meillet 1967:103-9). This fact has led a number of scholars to deny the phonemic status of these sounds in Indo-European and to suggest that their occurrence in the daughter languages is due to secondary developments. The first to suggest that the voiceless aspirates might be secondary was Ferdinand de Saussure. In a paper presented in 1891, he derived these sounds from sequences of plain voiceless stop plus a following "coefficient sonantique". A laryngeal explanation, along the lines proposed by de Saussure, has much to recommend it in many cases (for discussion and examples, cf. Allen 1976:237-47; Burrow 1973:71-3 and 393; Kuryłowicz 1935:46-54; Lehmann 1952:80-4; Polomé 1971:233-51; Sturtevant 1942:83-6). While de Saussure's theory accounts for the origin of some cases of voiceless aspirates, it does not explain all. There is a small group of words of onomatopoeic origin that contain voiceless aspirates (cf. Meillet 1967:106 for examples); a laryngeal explanation can be ruled out here. Finally, some voiceless aspirates in Indo-Aryan seem to owe their origin to the spontaneous aspiration of the plain voiceless stops after a preceding *s* (cf. Burrow

ture of aspiration is phonemically irrelevant in a system of this type.

The Indo-European stop system as reconstructed by Gamkrelidze-Hopper-Ivanov may be represented as follows (cf. Gamkrelidze 1976:403):

Glottalized Voiced (Aspirates) Voiceless (Aspirates)

(p')	bh/b	ph/p
t'	dh/d	th/t
k'	gh/g	kh/k
k' ^h	g ^h h/g ^h	k ^h h/k ^h

The resulting system belongs to a quite common type. Similar systems can be found in the Caucasian languages, many American Indian languages, and several sub-Saharan African languages (cf. Ruhlen 1976 for details). The system of Gamkrelidze-Hopper-Ivanov, therefore, fulfills the requirement of typological acceptability that is lacking from the traditional reconstruction. Moreover, their system receives strong support from the fact that the phoneme traditionally reconstructed as **b* was so rare as to be virtually nonexistent in the Indo-European parent language. A gap at this point of articulation is to be expected if the traditional plain voiced stops had been ejectives since it is common for languages having ejectives to lack the bilabial member (cf. Greenberg 1970:127)³. Next, under the revised interpretation, the root structure constraint laws become simply a voicing agreement

³This same observation led Martinet to note in 1953: "Comme il y a fort peu de traces sûres du phonème de l'indo-européen commun reconstruit 'analogiquement' comme **b*, il est tentant de diagnostiquer là aussi une case vide, ce qu'a fait le regretté Holger PEDERSEN dans *Die gemeinindoeuropäischen und die vorindoeuropäischen Verschlusslaute*, p. 10-16. Mais, au lieu de supposer avec Pedersen la disparition d'un **p* pré-indo-européen suivie d'un chassé-croisé des *mediae* et des *tenues*, on pourrait voir dans la série **d*, **g*, **g^h* le résultat d'une évolution à partir d'une série plus ancienne de glottalisées sans représentant labial".

rule with the corollary that two glottalics cannot co-occur in a root (for details, cf. Gamkrelidze 1976:404-5; Hopper 1973:§3.2.6). Finally, the Armenian and Germanic "sound-shifts" turn out to be mirages; under the new system, these branches are to be seen as relic areas. In fact, they provide a key piece of evidence in support of the revisions proposed by Gamkrelidze-Hopper-Ivanov.

1.4. Development of the Glottalics:

There is no uniform treatment of the glottalics. The Germanic, Armenian, Tocharian, and Anatolian developments are straightforward: deglottalization. In the remaining daughter languages, the glottalics have developed into plain voiced stops. The development may have gone as follows: glottalized → creaky voice → full voice. Such a progression is perfectly natural and has parallels in several of the Caucasian languages (cf. Colarusso 1975:82f; Gamkrelidze-Ivanov 1973:154). In the Modern South Arabian languages, "the post-glottalized (ejective) consonants have partially voiced and more rarely wholly voiced variants" (cf. Johnstone 1975:§2.1.2). Another parallel may also exist with several dialects of Arabic, where an earlier */k'/ has developed into /g/ (though perhaps passing through a different progression than that suggested here for Indo-European; cf. Martinet 1975[1959]:241-3).

The development of the glottalics into voiced stops in Indo-Iranian, Baltic, Slavic, Albanian, Italic, Celtic, and Greek must have taken place in the early prehistory of these branches themselves and not in the parent language. That is to say that we are dealing here with parallel developments and not a common innovation. This is proved by the fact that the glottalics were treated differently in each daughter language once they had been changed into voiced stops. In Albanian, Baltic, Slavic, and Iranian, the glottalics merged completely with the traditional voiced aspirates. In Indo-Aryan, the glottalics became plain voiced stops but did not merge with the voiced aspirates. In Italic and Greek, the change of glottalics into voiced stops probably

took place only after the voiced aspirates had become voiceless aspirates (cf. Hopper 1973:§3.3.2) since the two series are kept completely separate. The change of voiced aspirates into voiceless aspirates is not without parallels; one can cite the example of Romany (cf. Meillet 1967:100).

1.5. *The Gutturals:*

In my opinion, Late Indo-European had only two guttural series: (1) plain velars and (2) labialized velars (the latter usually referred to as labiovelars):

k	g	kʰ	plain velars
kʷ	gʷ	kʷʰ	labialized velars

I follow Lehmann (1952:8) and Meillet (1964:91-5) in not assigning a third series, the traditional palatals, to Proto-Indo-European but in viewing the phonemicization of palatalized velars as an innovation of the Disintegrating Indo-European antecedent of the satem languages⁴. The gutturals probably developed as follows (cf. Bomhard 1979:§5):

- A. Late (i.e., post-Anatolian) Indo-European had the two guttural types mentioned above. The plain velars, however, had nonphonemic palatalized allophones when contiguous with front vowels and apophonic *o* as well as before *y* (and perhaps in some cases even before *a*)⁵.

⁴The fullest discussion of the development of palatalized velars in Indo-European is to be found in the *Introduzione alla storia delle lingue indoeuropee*, pp. 28-34, by the Bulgarian master Vladimir Georgiev.

⁵In his cross-linguistic study of palatalization, D. N. S. Bhat (1978:60-7) discusses palatalizing environments. He notes (p. 60): "The most prominent environment that could induce palatalization in a consonant is a following front vowel (especially the high- and mid-front unrounded vowels *i* and *e*), and a following palatal semivowel (*yod*). These are reported to be effective in palatalizing a preceding

- B. In the Disintegrating Indo-European antecedents of the satem languages, the labialized velars are (perhaps only partially at first) delabialized. The newly delabialized velars merge with the unpalatalized allophones of the plain velars. This change then brings about the phonemicization of the palatalized allophones of the plain velars since both palatalized and unpalatalized (from earlier labialized) velars are now found in the vicinity of front vowels, apophonic *o*, and *y*. Thus, the Disintegrating Indo-European antecedents of the satem languages had the following gutturals (cf. §4.5):

c	č	cʰ	palatalized velars
k	g	kʰ	plain velars
(kʷ	gʷ	kʷʰ	labialized velars) ⁶

- C. Various shifts and levelings occur in the prehistory of the individual satem daughter languages that tend to obscure the earlier distribution of the gutturals (cf. Burrow 1973:76-7). More study is needed here to delineate these developments in as full detail as possible.

1.6. *Vowel Gradation:*

The form of Indo-European spoken immediately prior to the emergence of the non-Anatolian daughter languages was characterized by an

consonant in almost all of the languages examined by us. A following yod is more effective on apicals, whereas a following vowel, especially stressed, is more effective on velars... Velars may also be palatalized by a following low front vowel..." (p. 62) "There are only a limited number of instances in which a front vowel (or a high back vowel) is reported to have palatalized a following consonant". That is to say that, while the latter does in fact occur, it is a far less frequently attested phenomenon than the palatalization of a preceding consonant. Bhat (1978:66) also discusses the fact that certain environments may block palatalization: "We have noted only two environments that could be specified as capable of blocking palatalization. They are (1) an apical trill or tap, and (2) a retroflex consonant. Both these could prevent the palatalization of a velar consonant; that is, they could block the tongue fronting tendency of a given environment".

⁶At this time, the labialized velars could only have been marginal phonemes of very limited occurrence (if they even existed at all).

interchange of vocalic elements that could occur in any syllable. This interchange, which is commonly called "ablaut" or "vowel gradation", was partially correlated with the position of the accent and with distinctions between morphological categories. It is usually agreed (cf. Meillet 1964:153-68, e.g.) that $e/\bar{e} \sim o/\bar{o} \sim \emptyset$ were in contrast and that the vowel a played no role in this system. The truth is, however, that a played a central role in the development of vowel gradation.

The reduction and expulsion of a vocalic element is caused by a marked decrease in the amount of stress placed on a particular syllable. When one syllable of a word is stressed more than the other syllables, the vowels of the unstressed syllables tend to be either weakened or lost. This is precisely what has happened in those daughter Indo-European languages that have developed a system of accentuation based upon stress. In like manner, the development of quantitative gradation in the Indo-European parent language, which is the earliest ablaut change that can be recovered, must have been caused by the phonemicization of a strong stress accent (cf. Burrow 1973:108-12; Lehmann 1952:§15.4)⁷. This accent, which was used to denote the morphologically

⁷Hyman's (1978:207) description of stress is exactly what I have in mind for Indo-European: "Correlating with stress is a changing pitch (usually rising from an unstressed to a stressed syllable and falling from a stressed to an unstressed syllable), greater duration (for example, vowel lengthening in a stressed open syllable), and greater force of articulation (for example, the tendency for consonants to become aspirated or geminated). While the pitch characteristics of a word such as *data*, with stress on the first syllable, are not perceptibly different from a sequence of high followed by low tone in an African tone language, linguistic tone has not been shown to have any of the above effects. Since both stress and high tone correlate with prominent pitch, it must be concluded that the segmental effects of stress are due entirely to its *culminative* function. Both vowel lengthening and fortition signal the prominence of a syllable which has culminative stress". Hyman (1975:207-8) also notes: "Since stress has these *intrinsic* properties associated with it, it is not surprising to find languages *phonologizing*...these properties into the rules of the language. Numerous cases of *strengthening* in stressed syllables and *weakening* in unstressed syllables are attested..." Finally (Hyman 1975:231): "In a stress-accent language, a single culminative mark of prominence is possible on a given

distinctive syllable, caused the elimination of the vowels of unstressed syllables. There was a phonemic contrast between those syllables with stress and those syllables without stress. Since an initial syllable might have been considered to be morphologically significant in certain inflectional and derivational categories, and medial or final syllables might have been significant in other categories, the same word could appear in any one of a number of different forms depending upon how it was used grammatically; a particular syllable might have been stressed at one time and unstressed at another. This form of Indo-European may be called "Stress Indo-European". It was probably during this period of development that the syllabic allophones of the resonants came into being.

It must have often happened that more than one syllable of a word was considered to be morphologically significant. For example, according to the rules of derivation and inflection (cf. Bomhard 1975:§3.4 and Burrow 1973:119, 220f, and 303 for details), the initial syllable of a word might have received the stress. At the same time, an inflectional ending might have been added, and this ending, in order not to be ambiguous morphologically, might also have had a full-grade vowel in addition to that found in the accented syllable. When words with more than one full-grade syllable became common, stress ceased to be phonemically distinctive. High pitch then became the suprasegmental marker of the full-grade syllable that would normally have received the stress according to the rules of derivation and inflection, while the remaining full-grade syllable received low pitch. This period of development may be called "Pitch Indo-European". It was during this period that qualitative distinctions arose. According to Lehmann (1952:§15.3), an original *e*-grade vowel was changed to an *o*-grade vowel when the (high) pitch was moved from the *e*-grade vowel to another syllable. However, even

syllable of a word. The perceptual cues of this stress can be changing pitch, vowel duration, or greater intensity, all contributing to the highlighting of the stressed syllable."

though I agree that pitch was the conditioning agent, I think that these theories must be modified. I agree with Schmitt-Brandt (1967: 124f) that the original vowel was *a* and not *e*. Furthermore, as noted on the preceding page, I think that there must have been two types of pitch, viz., high pitch and low pitch (cf. Bomhard 1979:§26; Kiparsky 1973:794f)⁸. Under high pitch, *a* and *ā* developed front allophones, and, under low pitch, they developed back allophones. (A similar phenomenon may be observed in the Saigon dialect of Vietnamese, where the vowel [a] has front allophones under high tones and back allophones under nonhigh tones [cf. Thompson 1965:90]). The allophones of *a* and *ā* became phonemic when a morphologically conditioned pitch shift caused them to become partially disassociated from pitch distribution. This pitch shift may be equated with the beginnings of the development of columnar accentuation.

The development of qualitative gradation may be illustrated by positing a Stress Indo-European **t'iwā*, the nom-acc-voc. of a common gender thematic agent noun/adjective meaning "(one) connected with light or brilliance", hence "god, divine". The genitive was formed by adding the ending *-s*, and the fact that this was a weak case was indicated by moving the position of the accent to the first syllable: **t'īwas*. Note that the vowel *a* was retained for clarity. Since the vowel *a* implied the presence of accent, when the accent fell on *i* or *u*, an *a* was inserted, thus creating a secondary full-grade. The resulting form was **t'āiwas*. High pitch then replaced stress as the suprasegmental marker of morphologically significant syllables. Under high pitch, *a* and

⁸Hyman's (1975:231) description of the tonal characteristics of pitch-accent languages is precisely what I think existed in Pitch Indo-European: "In a pitch-accent language, prominence is assigned to a given syllable of a word, but there can be two or more kinds of prominence (for example, a rising vs. a falling contour). Pitch-accent languages are thus tonal to the extent that the feature which is assigned is tone (and that this tone can contrast with another tone in the same position). Pitch-accent languages are like stress-accent languages, however, in that there cannot be more than one syllable per word which receives the tonal accent; that is, prominence in pitch-accent languages is culminative."

\tilde{a} developed front allophones, and under low pitch, they developed back allophones. These allophones gained phonemic value when a morphologically conditioned pitch shift caused them to become partially disassociated from pitch distribution: $*t'iwás > *t'áiwás > *t'eíwós$ (cf. Skt. nom. sg. *devá-s* "god", Lith. *dīėvas* "god").

Pitch Indo-European was followed by "Late Indo-European". In Late Indo-European, the front and back allophones of a and \tilde{a} became phonemic except that the laryngeals \mathfrak{z}_2 and \mathfrak{z}_4 prevented a contiguous \acute{a} from becoming e . This is a reformulation of the theory that maintains that these laryngeals changed a contiguous e into a (cf. Kurylowicz 1935:28; Sturtevant 1942:§38 and §39). These laryngeals, however, had no effect on the change of \grave{a} and $\tilde{\acute{a}}$ to o and \bar{o} respectively (cf. Sturtevant 1942: §38 and §43). These developments may be represented diagrammatically as follows⁹:

\acute{a}	>	e ; a (when next to \mathfrak{z}_2 or \mathfrak{z}_4)
\grave{a}	>	o
$\tilde{\acute{a}}$	>	\bar{e} ; \bar{a} (when next to \mathfrak{z}_2 or \mathfrak{z}_4)
$\tilde{\grave{a}}$	>	\bar{o}

In Hittite and the other older Indo-European languages of ancient Anatolia, the back allophones of a and \tilde{a} must have remained sub-phonemic since there is no evidence that these languages ever possessed o or \bar{o} (cf. Bomhard 1976:§7.3). This implies that the Anatolian languages must have become separated from the main speech community before the phonemicization of o and \bar{o} , that is

⁹Martinet (1975[1972]:113) seems to have had in mind developments similar to what I postulate for the vowel $*a$ in Indo-European: "Il y a eu une période où [a] était une des réalisations du phonème vocalique unique et, selon toute vraisemblance, la réalisation la plus normale. Ce n'est pas qu'à partir du moment où la voyelle s'est scindée en /æ/ et en /ā/ ouvrant la voix jusqu'au /e/ et /o/ fermés du grecque attique, qu'emprunts, formes expressives, onomatopées diverses se sont réalisés avec une voyelle que nous retrouvons, dans les langues attestées, sous la forme d'un /a/, phonème qu'il faut, dès avant le début de toute diaspora connue, passer comme distinct au moins de /e/."

to say, before the period of development that I have called "Late Indo-European".

In "Disintegrating Indo-European", laryngeals were lost (1) initially before vowels and (2) after vowels when a nonsyllabic followed (cf. Lehmann 1952:§15.6E.b). The loss of preconsonantal laryngeals after short vowels caused these vowels to be lengthened (cf. Kuryłowicz 1935:28; Lehmann 1952:§3.6B; Sturtevant 1942:66f).

1.7. *The Long Vowels:*

The origin of the long vowels has always been enigmatic. Many theories have been proposed, none of which has been completely satisfactory. One thing seems certain, though: the long vowels developed over a long period of time and had many causes.

On general theoretical and typological grounds, I think it probable that long vowels always existed¹⁰. That is to say that long vowels were inherited from pre-Indo-European. In addition to those inherited from pre-Indo-European, new long vowels arose from the contraction of two short vowels. Though probably not frequent in the earlier stages of development, contraction became increasingly important, especially in the later stages of the parent language and the early stages of the daughter languages when the upheavals that were caused by the loss of whole classes of phonemes often brought two or more previously separated vowels into contact. Finally, vowels were lengthened to

¹⁰One of the reasons that I assume that long vowels existed in pre-Indo-European as well as in every period of development in Indo-European proper is that I believe that Indo-European always had a contrast between heavy syllables and light syllables, and, in general, "all languages with a heavy vs. light syllable dichotomy have a vowel-length contrast, that is CV contrasts with CV:, which patterns with CVC" (cf. Hyman 1975:206). Another reason is that the comparison with the Afro-asiatic languages demands that long vowels be reconstructed.

compensate for the loss of a following phoneme. The most significant cause of compensatory lengthening was the loss of preconsonantal laryngeals after short vowels in Disintegrating Indo-European.

1.8. *The vowels i and u:*

In reconstructing the Indo-European phonemic system, the vowels *i* and *u* are usually treated as allophones of *y* and *w* respectively and are classed together with *m*, *n*, *l*, *r* (cf. Lehmann 1952:10f; Meillet 1964:105f). However, the patterning of *i* and *u* is not entirely parallel to that of the other resonants, and Szemerényi (1967:82) is thus quite justified in questioning the validity of the traditional treatment. These vowels should, in fact, be considered as independent phonemes (cf. Bomhard 1975:§3.7).

The traditional treatment assumes that *i* and *u* result from the weakening of full-grade forms when the accent is shifted to another syllable (cf. Burrow 1973:108f). The patterning found in the daughter languages suggests such an interpretation, but that patterning may not be original in every case. It can be convincingly demonstrated in several cases that secondary full-grades have been created from weak-grade forms (cf. Anttila 1969:163f). Both Schmitt-Brandt (1967:8f) and Wyatt (1970:58) assume that every *ei*, *eu*, and the like are secondarily derived, but it is unlikely that such a gradation pattern would have developed were it not for a pre-existing pattern. Hence, though not universally applicable, secondary derivation of full-grade forms is certainly probable in a number of cases.

The vowels *i* and *u* thus had two origins: First, they were independent phonemes inherited from pre-Indo-European. Next, they developed from the stress conditioned weakening of full-grade forms.

It seems reasonable to assume that long *i* and *u* were also inherited from pre-Indo-European. When secondary full-grades were created with long *i* and *u*, the result was the same as with short *i* and *u*. This is clear from the thematic optative, which is formed by contraction of

the thematic vowel and the optative ending: $o + \bar{\epsilon}$, cf. Gk. φέρους. This, in part, explains the origin of the short and long weak-grade variation.

1.9. *Accentuation:*

The system of accentuation of Late Indo-European was characterized by contrasts in pitch, two types of which were distinguished: high pitch and low pitch. Stress was nondistinctive. Every word, except when used enclitically, bore an accent; however, each word had only one accented syllable. The accented syllable had high pitch, and all other syllables had low pitch.

The accent could fall on any syllable, initial, medial, or final. The position of the accent was morphologically conditioned, accentuation being one of the means by which Indo-European distinguished grammatical categories. Though originally not restricted to a particular syllable, there was a tendency to level out the paradigm and fix the position of the accent throughout. This tendency, the development of columnar accentuation, began in Late Indo-European and continued through Disintegrating Indo-European into the daughter languages. Therefore, the earlier system is only imperfectly preserved in even the most conservative of the daughter languages, Vedic Sanskrit.

There is internal evidence that at one time stress was the dominant characteristic of the Indo-European system of accentuation. The quantitative vowel gradation, of which all of the older daughter languages preserve traces, must have come into being as the result of a strong stress accent. However, in the latest period of development, stress had ceased to have any effect on vowel quantity in the parent language. The preceding treatment closely follows Kiparsky (1973:794f).

1.10. *The Laryngeals:*

The basic (and most broadly-accepted) tenets of the Laryngeal

Theory may be summarized as follows: (1) The Indo-European parent language possessed one or more laryngeals; most scholars posit either three (Beekes, Benveniste, Burrow, Couvreur, Cowgill, Keiler, Lejeune) or four (Kerns-Schwartz, Kuryłowicz, Lehmann, Sapir, Sturtevant). (2) The laryngeals were lost as independent phonemes in all branches of Indo-European except for Anatolian (cf. Bomhard 1976:222f; Lehmann 1952:25f; Puhvel 1965:79f; Sturtevant 1942:35f and 1951:47f) and Armenian, where the laryngeal ğ_2 appears as h initially before vowels in a small number of words (cf. Austin 1942:22f; Bomhard 1976:§12.11; Sturtevant 1942:§22a; Winter 1965a:102). (3) The loss of preconsonantal laryngeals after short vowels caused the compensatory lengthening of these vowels (cf. Benveniste 1935:149; Bomhard 1979:§3; Kuryłowicz 1935:28; Lehmann 1952:§12.2; Lindeman 1970:17; Sturtevant 1942:66f). (4) One or more of the laryngeals influenced the quality of contiguous vowels (cf. Benveniste 1935:149; Bomhard 1975:§5.5; Couvreur 1937:266f; Kuryłowicz 1935:28f; Lehmann 1952:§12.6; Lindeman 1970:17; Sturtevant 1942:§38 and §39). (5) The so-called "long syllabic resonants" (m̥ , n̥ , l̥ , r̥) are to be reinterpreted as sequences of m , n , l , r plus laryngeal (cf. Burrow 1973:87; Lehmann 1952:§12.3; Sturtevant 1942:§69). (6) Some cases of voiceless aspirates in Indo-Aryan owe their origin to the former presence of a laryngeal between an immediately preceding plain voiceless stop and an immediately following vowel (cf. Kuryłowicz 1935:29; Lehmann 1952:80f; Lindeman 1970:77f; Sturtevant 1942:83f). (7) Indo-European had no initial vowels; in every instance where initial vowels had been reconstructed for Indo-European by the Neogrammarians, a preceding laryngeal has been lost (cf. Kuryłowicz 1935:29). (8) Finally, the laryngeals could have both syllabic and nonsyllabic variants depending upon their environment (cf. Benveniste 1935:149; Couvreur 1937:303f; Keiler 1970:70f). That is to say that the patterning of the laryngeals was similar to that usually assumed for the resonants. The syllabic form of the laryngeals is commonly associated with the schwa primum reconstructed for Indo-European by the Neogrammarians.

In my opinion, the form of the Laryngeal Theory that conforms best to the evidence found in the daughter languages is that which assumes four laryngeals for the Indo-European parent language. Specifically, I would reconstruct *at least* four laryngeals for pre-Anatolian Indo-European (i.e., "Pitch Indo-European") and for that form of Indo-European existing immediately following the separation of the Anatolian languages from the main speech community ("Late Indo-European"). However, for the Indo-European antecedent of the non-Anatolian daughter languages ("Disintegrating Indo-European"), I would only reconstruct one laryngeal.

Disintegrating Indo-European must have had the full complement of long and short vowels traditionally reconstructed (cf. Szemerényi 1967:67f). Furthermore, Disintegrating Indo-European must have had initial vowels; to assume otherwise would be to ignore the evidence of the non-Anatolian daughter languages as well as to deny the efficacy of the Comparative Method. This can only mean that the vowel-lengthening and vowel-coloring effects usually attributed to the laryngeals must have taken place prior to the Disintegrating Indo-European period. On the surface, it would thus appear as if one could almost get by without positing any laryngeals at all for this period. At least one laryngeal must be reconstructed for Disintegrating Indo-European, however, to account for developments in the non-Anatolian daughter languages such as (1) the Indo-Aryan voiceless aspirates (cf. Burrow 1973:72; Lehmann 1952:80f); (2) the Greek prothetic vowels (cf. Beekes 1969:18f; Cowgill 1965:151f; Lejeune 1972:204); (3) the Greek rough breathing, in part (cf. Sturtevant 1942:76f); (4) Armenian initial *h*, in part (cf. Bomhard 1976:§12.11; Greppin this volume); (5) the Balto-Slavic intonations (cf. Vaillant 1950:241f); and (6) the Germanic *Verschärfung* (cf. Lehmann 1952:36f). I believe that it was this single laryngeal of Disintegrating Indo-European that had a syllabic variant.

For pre-Anatolian Indo-European, at least four laryngeals must be reconstructed (cf. Sturtevant 1942:35f). There is no other con-

vincing way to account for (1) Disintegrating Indo-European **e* without a corresponding Anatolian laryngeal reflex (this is Kuryłowicz's \mathfrak{z}_1); (2) Disintegrating Indo-European **a* with a corresponding Anatolian laryngeal reflex (this is Kuryłowicz's \mathfrak{z}_2); (3) Disintegrating Indo-European **e* (Kuryłowicz 1935:28-9 posits **o* here) with a corresponding Anatolian laryngeal reflex (this is Kuryłowicz's \mathfrak{z}_3); and (4) Disintegrating Indo-European **a* without a corresponding Anatolian laryngeal reflex (this is Kuryłowicz's \mathfrak{z}_4). Note that I disagree with Kuryłowicz on the vowel-coloring effects of his third laryngeal (cf. here Sturtevant 1942:§9b and 1951:§75). It was pre-Anatolian Indo-European that had no initial vowels.

I assume that, after the laryngeals had been lost in various positions in Disintegrating Indo-European, they merged into /h/ wherever they remained (cf. Bomhard 1975:§6.7 and 1976:§12.13). It is on the basis of the Armenian reflex that I assume this single laryngeal to have been a voiceless glottal fricative. Szemerényi (1967:89f) and Vaillant (1950:241f) also agree that the Indo-European antecedent of the non-Anatolian daughter languages had only a single laryngeal and that that laryngeal was a voiceless glottal fricative.

1.11. *Conclusions:*

The Indo-European stop system as traditionally reconstructed must be considered as highly improbable in view of the fact that it is totally without typological parallels. Therefore, in order to satisfy the requirement that the Indo-European stop system conform to some degree of naturalness, it is necessary to substitute an alternate reconstruction for the traditional one. The revisions proposed by Gamkrelidze, Hopper, and Ivanov more than satisfy this requirement.

An analysis of the vowel gradation patterning found in the older Indo-European daughter languages makes it possible to recover traces of four separate periods of development in the Indo-European parent language: (1) the phonemic stress stage, (2) the phonemic pitch stage, (3) "Late Indo-European", and (4) "Disintegrating Indo-European".

Indo-European originally had at least four laryngeals. However, during the course of its development, Indo-European gradually lost most of these laryngeals. In the final period ("Disintegrating Indo-European"), only one laryngeal remained.

On the basis of the preceding discussion, we are now in a position to delineate the Indo-European phonemic inventory. Since we have discussed several periods of development within Indo-European, we could represent the phonemic inventory in any one of a number of different ways, each reflecting a different epoch in the prehistory of the Indo-European parent language. However, since the prehistoric development of the Indo-European phonological system will be discussed in the last part of this paper, we will restrict ourselves here to a single period, namely, "Late Indo-European". The "Late Indo-European" phonological system may be reconstructed as follows (cf. Bomhard 1975:§5.1):

Stops:

Voiceless:	p	t	k	k ^w
Voiced:	b	d	g	g ^w
Glottalized:		t'	k'	k' ^w

Fricatives:

Voiceless:	s
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Resonants:

Nasals:	m/ṃ	n/ṇ
Rolled:		r/ṛ
Lateral:		l/ḷ
Glides:	w/u	y/i

Vowels:

i	e	a	o	u
ī	ē	ā	ō	ū

Laryngeals:

h ₁	h ₂	h ₃	h ₄
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2. THE RECONSTRUCTION OF THE PROTO-SEMITIC CONSONANT SYSTEM:

2.1. *Introduction:*

Moscatti (1964:§8.3) reconstructs the Proto-Semitic consonant system as follows:

	Plosive	Fricative	Lateral	Lateral- ized ?	Rolled	Nasal
Bilabial	<i>p, b</i>					<i>m</i>
Interdental		<i>ṭ, ḍ, ṭ̥</i>		<i>ḏ</i>		
Dental	<i>t, d, ṭ</i>	<i>s, z, ṣ</i>	<i>l</i>	<i>ṣ</i>	<i>r</i>	<i>n</i>
Palato-alveolar		<i>ʃ</i>				
Velar	<i>k, q, g</i>	<i>ħ, ʕ</i>				
Pharyngeal		<i>ħ, ʕ</i>				
Laryngeal	<i>ʾ</i>	<i>h</i>				

The consonant system as reconstructed above is found in all of the standard handbooks, including Bergsträsser (1928:3-6), Brockelmann (1908:42-4), Gray (1934:8-10), O'Leary (1923:29-30), and Zimmern (1898:12). Even in works dealing with Afroasiatic, the above system, with but few modifications, has been taken as being identical with the consonant system of the Afroasiatic proto-language (cf. Cohen 1947:68 and 1952:90-1; Diakonoff 1965:18-29; Hodge 1971:12).

In spite of apparent unanimity in the reconstruction of the Proto-Semitic consonant system, voices of protest have been raised from time to time (cf. Cantineau 1952:79-94 and 1960:15-7; Martinet 1975[1953]:248-61). Indeed, the question of whether or not the above system is in fact an accurate representation of the consonant system of Proto-Semitic takes on increasing significance as more data become available from the other branches of Afroasiatic. In this, the second part of this paper, we will reexamine the reconstruction of the Proto-Semitic consonant system, taking into consideration, as much as current knowl-

edge permits, material from the cognate Afroasiatic languages. Each class will be investigated separately.

2.2. *Emphatics:*

In Arabic, the so-called "emphatics" are pharyngealized (cf. Al-Ani 1970:44). However, in the Modern South Arabian languages and in the Semitic languages of Ethiopia, they are glottalized (cf. Johnstone 1975:§2.1.2; Moscati 1964:§8.2). The cumulative evidence leaves little doubt that the emphatics were glottalized (ejectives) in Proto-Semitic. This conclusion is also reached by Cantineau (1952:93), Cohen (1968: 1301-3), Martinet (1975[1959]:238 and 1975[1953]:250-2), and Steiner (1977:155).

Pharyngealization is not incompatible with voicing but glottalization is (cf. Greenberg 1970:§2.2). Consequently, Arabic has voiced as well as voiceless emphatics (cf. Moscati 1964:§8.2). In Hebrew and Aramaic, however, the emphatics are never voiced (cf. Cantineau 1952: 93; Moscati 1964:§8.2), and the same is most likely true for Akkadian and Ugaritic as well. Therefore, it seems highly probable that the emphatics were glottalized in Hebrew, Aramaic, Akkadian, and Ugaritic rather than pharyngealized as in Arabic.

The emphatics of Arabic influence the quality of contiguous vowels (cf. Al-Ani 1970:23-4). The fact that nothing comparable is found in Akkadian, Hebrew, or Aramaic (cf. Cantineau 1952:93; Martinet 1975 [1959]:238; Moscati 1964:§8.2) lends additional support to the argument that the emphatics cannot have been pharyngealized in these languages.

Both Greenberg (1970:127) and Martinet (1975[1953]:251) have pointed out that it is common for languages having ejectives to lack the bilabial member. Now, it is extremely unlikely that Proto-Semitic possessed a bilabial emphatic (cf. Cantineau 1952:80-1; Moscati 1964: §8.7). A gap at this point of articulation is easy to understand if the emphatics had been ejectives in Proto-Semitic.

According to Cohen (1968:1302) and Martinet (1970:113-4), pharyngealized consonants can be derived from earlier ejectives, but the converse is not true. It should be noted, though, that this argument is based more on conjecture than on concrete evidence since pharyngealized consonants are rare typologically, and, therefore, comparative material is lacking.

The evidence from the other branches of Afroasiatic tends to support the contention that the emphatics were ejectives not only in Proto-Semitic but also in Proto-Afroasiatic.

Ancient Egyptian seems not to have had emphatics (cf. Vergote 1971:43). Only the velar emphatic retained autonomy, becoming /q/. The remaining emphatics seem to have merged with the unaspirated (earlier voiced) consonants. The developments probably went as follows: (1) The ejectives other than /k'/ became voiced consonants thus: glottalized → creaky voice → full voice. A similar progression is found in several of the Caucasian languages (cf. Colarusso 1975:82; Gamkrelidze-Ivanov 1973:154) and may also have taken place in the early prehistory of several of the Indo-European daughter languages if Gamkrelidze-Ivanov (1972:15-8 and 1973:150-6) and Hopper (1973: 141-66) are correct in their reinterpretation of the traditional plain voiced stops of Indo-European as ejectives (cf. also Bomhard 1979:§6). Parallels also exist in the Modern South Arabian languages, where "the post-glottalized (ejective) consonants have partially voiced and more rarely wholly voiced variants" (cf. Johnstone 1975:§2.1.2). It is not difficult to understand how /k'/ could have remained since back articulation is the unmarked point of articulation for ejectives (cf. Greenberg 1970:§2.3). (2) Next, the voiceless consonants became voiceless aspirated consonants (cf. Vergote 1971:43)¹¹. (3) Finally, the voiced consonants became unaspirated voiceless consonants (cf. Vergote 1971:

¹¹This step is unnecessary if, as seems likely, this series was originally aspirated in Proto-Afroasiatic and Ancient Egyptian.

43). It was then that /k'/ became /q/. Even though Ancient Egyptian did not possess emphatics, the internal development of this series in Egyptian can be explained by positing earlier ejectives.

In the modern Berber languages, the emphatics are pharyngealized as in Arabic (cf. Cohen 1968:1302). Both voiced and voiceless emphatics exist. It does not seem unreasonable to assume that the pharyngealized emphatics of Berber are due to secondary developments. Martinet (1970:§4.29) has suggested a possible evolution of ejectives to pharyngealized consonants by progressive relaxation of the glottal stricture thus:

$$p' \quad t' \quad k' \quad > \quad b^D \quad d^D \quad g^D \quad > \quad p^D \quad t^D \quad k^D$$

Of the modern Chadic languages, Angas, Dangaleat, Ga'anda, Higi, Margi, Tera, and Sayanci have implosives, while Hausa has implosives in the bilabial and dental series but ejectives in the sibilant and velar series corresponding to the Semitic emphatics (cf. Cohen 1968:1302). Martinet (1970:§4.28) has posited the development of ejectives into implosives by a progressive anticipation of the voice of a following vowel thus:

$$p' \quad t' \quad k' \quad > \quad 'b \quad 'd \quad 'g$$

If we follow Martinet, as I think we must, it is possible to derive the Chadic implosives from earlier ejectives.

The Cushitic and Omotic languages provide the strongest evidence in favor of interpreting the emphatics of both Proto-Semitic and Proto-Afroasiatic as ejectives. The Cushitic languages Awngi and Galab possess neither implosives nor ejectives and can, therefore, be disregarded since they probably do not represent the original state. Of the remaining Cushitic languages, Beja has only the retroflex implosive /'ḡ/; Galla has the retroflex implosive /'ḡ/ plus the ejectives /p', t', t͡ʃ', k'/; Bilin has the ejectives /t', t͡ʃ', k'/; Somali has a retroflex den-

tal /d/ (no doubt from earlier */'d/); and Iraqw has the affricate ejective /t͡s'/ (plus, marginally, /'b/ and /'d/). Of the modern Omotic languages, Kefa has the ejectives /t'/ and /t͡s'/, and Walamo has the ejectives /p', t', t͡s', c', k', s'/. These clearly correspond to the Semitic emphatics (for examples, cf. Cohen 1947).

Typologically, it makes sense to interpret the Proto-Semitic emphatics as ejectives. Pharyngealized consonants have an extremely limited occurrence among the languages of the world; this is not true, however, of ejectives. Ejectives are found in the Caucasian languages, many American Indian languages, and several sub-Saharan African languages. 129 (19%) of the 693 languages included in Ruhlen's (1976) massive survey contain ejectives.

2.3. Bilabials:

Semitic correspondences*:

Akk.	Ug.	Hebr.	Aram.	Ar.	ESA	Eth.
b	b	ב /b/	ב /b/	ب /b/	b	b
p	p	פ /p/	פ /p/	ف /f/	f	f
m	m	מ /m/	מ /m/	م /m/	m	m

*Each language is given in traditional transcription.

There can be no question that Proto-Semitic contained *b, *p, and *m. The f found in Arabic, Epigraphic South Arabian, and Ethiopic is surely an innovation and can easily be derived from earlier *p (cf. Moscati 1964:§8.6). Hebrew and Aramaic b and p have the nonphonemic allophones β and ϕ respectively (cf. Moscati 1964:§8.10).

It should be noted here that the voiceless stops were probably voiceless aspirates, i.e., /p^h, t^h, k^h/, in Proto-Semitic (cf. Cantinneau 1952:90-1; Martinet 1975[1953]:250).

The material from the other Afroasiatic languages supports the assumption that Proto-Semitic, as well as Proto-Afroasiatic, had the bilabials **b*, **p*, and **m*. Cf. Cohen 1947 for examples.

Afroasiatic correspondences:

Proto-Semitic	Berber: Shilha	Ancient Egypt.*	Cushitic:		Omotic: Kefa	Chadic: Hausa
			Beja	Somali		
*b	b	b	b	b	b	b
*p	f	p, f	f	f	f, p	Φ, h
*m	m	m, b	m	m	m	m

*Ancient Egyptian is given in traditional transcription. It should be noted, however, that the phonemes traditionally written as *b*, *d*, *ḏ*, *g*, *q* were probably /p, t, tʰ, k, q/ respectively, while the phonemes written as *p*, *t*, *ṯ*, *k* were probably /pʰ, tʰ, tʰʰ, kʰ/ respectively (cf. Callender 1975:§2.1; Vergote 1971:43).

Diakonoff (1965:20) reconstructs an emphatic bilabial, which he writes **ḑ*. However, as he himself admits, the evidence for this sound is extremely weak. At most, such a sound could only have had a very limited occurrence. It is best to agree with Cantineau (1952:80-1) and Moscati (1964:§8.7) that an emphatic bilabial should not be reconstructed for Proto-Semitic. It is unclear whether or not there is enough evidence from all of the branches to warrant positing an emphatic bilabial for Proto-Afroasiatic.

According to Greenberg (1958:295-302 and 1965:88-92), two additional bilabials should be reconstructed for Proto-Afroasiatic: **/f/* and **/ᵐb/*. While he has made a strong case for **/f/* separate from **/p/*, his theories concerning **/ᵐb/* are not convincing and have been successfully argued against by Illič-Svityč (1966:9-34); Illič-Svityč considers **/ᵐb/* to contain a prefix /m-/.

2.4. *Dentals:*

Semitic correspondences:

Akk.	Ug.	Hebr.	Aram.	Ar.	ESA	Eth.
d	d	ד /d/	ד /d/	د /d/	d	d
t	t	ט /t/	ט /t/	ط /t/	t	t
t	t	ת /t/	ת /t/	ت /t/	t	t
n	n	נ /n/	נ /n/	ن /n/	n	n

It is quite evident that Proto-Semitic contained **d*, **t'*, **t*, and **n*. Hebrew and Aramaic *d* and *t* have the nonphonemic allophones *ð* and *θ* respectively (cf. Moscati 1964:§8.10). In Akkadian, Hebrew, and Epigraphic South Arabian, *n* becomes *m* in mimation (cf. Diakonoff 1965:28, note 2, and 1965:61-2; Moscati 1964:96-100).

Afroasiatic correspondences:

Proto-Semitic	Berber: Shilha	Ancient Egyptian	Cushitic:		Omotic: Kefa	Chadic: Hausa
			Beja	Somali		
<i>*d</i>	d	d	d	d	d	d
<i>*t'</i>	d ^ɖ , t ^ɖ	d, t	'd	d̥	t'	'd, d
<i>*t</i>	t	t	t	t ^h	t	t
<i>*n</i>	n	n	n	n	n	n

The data from the remaining Afroasiatic branches leave no doubt that both Proto-Semitic and Proto-Afroasiatic had **d*, **t'*, **t*, and **n*. Cf. Cohen 1947 for examples.

Secondary palatalization of the dentals before front vowels is a widespread phenomenon, being especially common in the Semitic languages of Ethiopia and Chadic.

2.5. *Velars:*

Semitic correspondences:

Akk.	Ug.	Hebr.	Aram.	Ar.	ESA	Eth.
g	g	ג /g/	א /g/	ج /ǧ/	g	g
q	q	ק /q/	ק /q/	ق /q/	q	q
k	k	כ /k/	כ /k/	ك /k/	k	k

Proto-Semitic must have had **g*, **k'*, and **k*. Hebrew and Aramaic *g* and *k* have the nonphonemic allophones γ and χ respectively (cf. Moscati 1964:§8.10). P_{Sem}. **g* has become \check{g} in standard Classical Arabic (cf. Moscati 1964:§8.42) though it is retained unchanged in some dialects (cf. Martinet 1975[1959]:243-5).

Afroasiatic correspondences:

Proto-Semitic	Berber: Shilha	Ancient Egyptian	Cushitic:		Omotic: Kefa	Chadic: Hausa
			Beja	Somali		
<i>*g</i>	g, γ	g, <u>d</u> *	g	g	g	g
<i>*k'</i>	γ , k^{D}	q	g	g	q	k'
<i>*k</i>	k	k, <u>t</u> *	k	k ^h	k	k

*In Egyptian, *g* and *k* become d and t respectively before *i* and *u* (cf. Diakonoff 1965:28, note 11).

In addition to the above correspondences, which guarantee that both Proto-Semitic and Proto-Afroasiatic had **g*, **k'*, and **k*, there are other correspondences which hint at the existence of a series of labiovelars in Proto-Afroasiatic (cf. Cohen 1968:1303; Cohen 1947: 129-30).

Both secondary palatalization of the velars as well as a tendency toward fricative pronunciation are widespread developments.

2.6. "Interdentals":

Semitic correspondences:

Akk.	Ug.	Hebr.	Aram.	Ar.	ESA	Eth.
z	<u>d</u>	ז /z/	ד /d/	ذ /d/	<u>d</u>	z
š	<u>t̪</u>	ש /š/	ܫ /t̪/	ظ /z̪/	<u>z̪</u>	š
ṣ̌	<u>t̪</u>	שׁ /ṣ̌/	ܫׁ /t̪/	ظ̣ /t̪/	<u>t̪</u>	s

Moscatti (1964:27-30) reconstructs interdentals (IPA [ð], [θ'], [θ]) for Proto-Semitic on the basis of the Arabic reflexes. Cantineau (1952:81-2) reconstructs *apicales "à pointe basse"*. He notes: *Mais il est difficile de décider s'il s'agissait dès le sémitique de vraies spirantes ou d'affriquées à implosion occlusive et à dénouement spirant.* Finally, Cohen (1968:1304) and Martinet (1975[1953]:257-8) posit palatals, which Martinet writes *d̪, *t̪', and *t̪'. In my opinion, Martinet comes the closest to the truth. I believe that the developments found in the daughter languages can best be explained by reconstructing a series of palato-alveolar affricates for Proto-Semitic: *d̪, *t̪', *t̪̣.

The oldest Akkadian may have preserved this series. According to Gelb (1961:35-9), Akk. ṣ̌ corresponds to Hebr. ש̣ and Ar. t̪, while ṣ̌ may correspond to Hebr. ש and Ar. d̪. ṣ̌ and ṣ̌ are distinct from ṣ̌ and ṣ̌, which represent PSem. *ṣ̌ and *ṣ̌ respectively (cf. Gelb 1961:35). Cf. here also Diakonoff 1965:21, note 25.

It is difficult to establish clear correspondences between the various branches of Afroasiatic for this series. Sometimes affricates in the other branches seem to correspond to the Semitic *d̪, *t̪', *t̪̣, while in other cases, either dentals or sibilants are found (cf. Cohen

1947:157-61 for examples; see also Diakonoff 1965:26 and 1974:595-7). Ancient Egyptian has the clearest correspondences: PSem. $*\underline{d\check{s}}$ ~ Eg. \underline{d} / $\underline{t\check{s}}$ /; PSem. $*\underline{t\check{s}}$ ~ Eg. \underline{d} / $\underline{t\check{s}}$ /; PSem. $*\underline{t\check{s}}$ ~ Eg. \underline{t} / $\underline{t\check{s}^h}$ /.

Palato-alveolar affricates are extremely common in modern Chadic, Cushitic, and Omotic languages. Some of these affricates are clearly due to secondary developments. Such is the case, for example, in several modern Arabic dialects (Iraqi, etc.) and in the modern Semitic languages of Ethiopia. However, enough good correspondences can be established to make it seem probable that a series of palato-alveolar affricates existed as part of the Proto-Afroasiatic phonemic inventory.

2.7. *Sibilants:*

Semitic correspondences:

Akk.	Ug.	Hebr.	Aram.	Ar.	ESA	Eth.
š	š	š /š/	š /š/	س /s/	s ¹	s
z	z	ז /z/	ז /z/	ز /z/	z	z
š	š	ש /š/	ש /š/	ش /š/	š	š
s	s	ס /s/	ס /s/	س /s/	s ³	s

From the preceding table of correspondences, it would appear certain that a series of sibilants should be reconstructed for Proto-Semitic. However, appearances can be misleading. There is some evidence that this series was originally composed of dental affricates (cf. Cohen 1947:141, 143, and 145; Diakonoff 1965:20-1 and 1974:595; Martinet 1975[1953]:253-4): $*\underline{d\check{s}}$, $*\underline{t\check{s}}$, $*\underline{t\check{s}}$. This does not mean that the independent existence of sibilants in the Semitic parent language is to be excluded. On the contrary, in addition to the dental affricates, Proto-Semitic must also have had, at the very least, the sibilants $*s$ and $*\check{s}$.

The primary evidence for earlier dental affricates comes from Hebrew and Akkadian (cf. Diakonoff 1965:20-1). First, the emphatic sibilant, ṣ / $\text{ṣ}/$, is traditionally pronounced as a dental affricate in Hebrew, and, as noted by Cantineau (1952:83), this pronunciation is not a recent or secondary development. Next, it is now known that the Hittite cuneiform syllabary was borrowed at the beginning of the second millennium B. C. directly from that form of Old Akkadian then written in Northern Syria (cf. Gamkrelidze 1968:91-2) and not from Hurrian as previously thought (cf. Sturtevant 1951:§5). The Hittite syllabary contains signs that are transliterated with a z but which, in fact, represent the dental affricate / $\text{ts}/$ (cf. Sturtevant 1951:§25). This seems to indicate that the z of Old Akkadian was pronounced as an affricate (cf. Martinet 1975[1953]:254). Also worth noting is the fact that Hittite employed the cuneiform signs containing ṣ to represent / $\text{s}/$ (cf. Sturtevant 1951:§50). Since the Akkadian cuneiform syllabary contained signs traditionally transliterated with s in addition to those transliterated with ṣ , we must conclude that the Hittites chose the latter signs because they were closer to their sibilant than the former. We may venture a guess that the Hittites chose the ṣ -signs because the s -signs represented affricates in Akkadian at the time that they adopted the cuneiform writing system. This conclusion is supported by the Hurrian evidence, where the cuneiform signs with z and s are used to denote affricates (cf. Diakonoff 1965:21).

Additional evidence for affricate pronunciation comes from Egyptian material dating from the second millennium B. C. In transcribing Semitic words and names, Egyptian fairly consistently uses t for s in the Semitic words and d for z and ṣ in the Semitic words (for examples, cf. Albright 1934:33-67).

Finally, Cantineau (1952:83) and Cohen (1947:145) briefly mention the fact that ṣ is mostly pronounced as either an affricate or as a dental stop in the Semitic languages of Ethiopia.

In the other branches of Afroasiatic, affricates, dentals, and sibilants correspond to the Semitic *dṣ , *ts , and *ts (cf. Cohen

1947:141-7; Diakonoff 1965:26). In my opinion, the developments in all branches of Afroasiatic can best be explained by reconstructing a series of dental affricates for Proto-Afroasiatic. This is also the opinion of Cohen (1968:1304).

2.8. *Fricative Laterals:*

Semitic correspondences:

Akk.	Ug.	Hebr.	Aram.	Ar.	ESA	Eth.
ṣ	ṣ	צ /ṣ/	ܥ /ʿ/	ض /ḍ/	ḍ	ḍ
š	š	שׁ /š/	ܫ /s/	ش /š/	s ²	š

The Modern South Arabian languages contain the fricative laterals /ɬ/ and /ɬ̥/ (cf. Johnstone 1975:§2.1.3; Steiner 1977:20). The voiceless fricative lateral /ɬ̥/ corresponds to sibilants in the other Semitic languages. In Hebrew, however, a special character, adapted from šin and transliterated as *ś*, appears in words whose cognates in the South Arabian languages contain fricative laterals (cf. Moscati 1964:§8.29). The evidence of Hebrew, coupled with that of South Arabian, makes it seem likely that Proto-Semitic contained the voiceless fricative lateral /ɬ̥/. Cantineau (1952:84-7) and Steiner (1977:155-6) concur with this reconstruction. Martinet (1975[1953]:253), however, would rather posit an affricate *tʃ̥. As noted by Steiner (1977:155-6), Martinet's reconstruction cannot be excluded.

The original pronunciation of the Arabic sound transliterated as *ḍ* (ض) can be determined by the testimony of the native grammarians (cf. Steiner 1977:57-67) and from the evidence of loanwords in other languages (cf. Steiner 1977:68-91). In all probability, this sound was originally a voiced emphatic fricative lateral (cf. Steiner 1977:64-5). This sound can be derived from either an earlier glottalized fricative lateral /ɬ̥'/ (cf. Steiner 1977:155-6) or an earlier glottalized affri-

cate /tʃʰ/ (cf. Cohen 1968:1304-5; Martinet 1975[1953]:253). Either reconstruction can also account for the developments found in the other Semitic daughter languages.

According to Cohen (1947:137), a voiceless fricative lateral /ɬ/ should probably be reconstructed for Proto-Afroasiatic. The same also applies to the glottalized fricative lateral /ɬʰ/ though convincing cognates are difficult to come by. It should be noted that fricative laterals are quite common in Chadic and are not unknown in Cushitic (Iraqw).

2.9. Liquids and Semivowels:

Semitic correspondences:

Akk.	Ug.	Hebr.	Aram.	Ar.	ESA	Eth.
r	r	ר /r/	ר /r/	ر /r/	r	r
l	l	ל /l/	ל /l/	ل /l/	l	l
ø	w, y	ו /w/, י /y/	ו /w/, י /y/	و /w/	w, y	w
γ, ø	γ	י /y/	י /y/	ي /y/	γ	γ

There can scarcely be any doubt that Proto-Semitic had *r, *l, *w, and *y. These sounds must also have existed in the Afroasiatic parent speech (cf. Cohen 1947 for examples).

Afroasiatic correspondences:

Proto-Semitic	Berber: Shilha	Ancient Egyptian	Cushitic:		Omotic: Kefa	Chadic: Hausa
			Beja	Somali		
*r	r, l	r, ʔ	r, n, l	r, n, l	r, l	r
*l	l, r, n	n, r, ʔ	l, n, r	l, n, r	l, r	l
*w	u, w	w	w, y	w, y	w	w
*y	i, y	ʔ, y	y	y	y	y

2.10. *Glottal Stop and Glottal, Velar, and Pharyngeal Fricatives:*

Semitic correspondences:

Akk.	Ug.	Hebr.	Aram.	Ar.	ESA	Eth.
' , ø	ğ	ʔ / ʕ/	ʔ / ʕ/	ğ / ʕ/	ğ	ʕ
ħ	ħ	ħ / ʕ/	ħ / ʕ/	ħ / ʕ/	ħ	ħ
' , ø	ʕ	ʕ / ʕ/	ʕ / ʕ/	ʕ / ʕ/	ʕ	ʕ
' , ø	ħ	ħ / ʕ/	ħ / ʕ/	ħ / ʕ/	ħ	ħ
' , ø	ʔ	ʔ / ʕ/	ʔ / ʕ/	ʔ / ʕ/	ʔ	ʔ
' , ø	h	h / ʕ/	h / ʕ/	h / ʕ/	h	h

Even though Proto-Semitic had /ɣ, x, ʕ, ħ, ʔ, h/, it is doubtful whether Proto-Afroasiatic had /ɣ/ and /x/. In Semitic, these sounds were derived from earlier /ʕ/ and /ħ/ respectively (cf. Cohen 1968: 1306).

2.11. *Conclusions:*

It is clear from the preceding discussion that the consonant system traditionally reconstructed for Proto-Semitic is not, in fact, an accurate representation of what actually existed. Some classes, such as the bilabials, dentals, and velars, hardly required any discussion since the reflexes found in the daughter languages leave little doubt as to what existed in the Semitic parent language; here, the traditional reconstructions are surely correct. This is not true, however, of the emphatics, interdental, or sibilants; here, a brief reexamination of the evidence showed that the traditional reconstructions are probably wrong. It was argued that the emphatics were originally ejectives, while the interdental were reinterpreted as palato-alveolar affricates, and the sibilants were partially reinterpreted as dental affricates. These revisions are not only able to account for the developments in the daughter languages far better than the tradi-

tional reconstructions but are also more in agreement with the data from the cognate Afroasiatic languages.

Revised Proto-Semitic consonant system:

Stops and Affricates:

Voiceless:	p	t	<u>ts</u>	<u>tʃ</u>	k	
Voiced:	b	d	<u>dz</u>	<u>dʒ</u>	g	
Glottalized:		tʼ	<u>tsʼ</u>	<u>tʃʼ</u>	kʼ	ʔ

Fricatives:

Voiceless:		s	ʃ	ʈ	x	ħ	h
Voiced:					ɣ	ʕ	
Glottalized:				ʈʼ			

Nasals:	m	n
Rolled:		r
Lateral:		l
Glides:	w	y

3. COMPARISON OF INDO-EUROPEAN AND AFROASIATIC:

3.1. *Introduction:*

There have been numerous attempts to connect Indo-European with Afroasiatic in some sort of genetic relationship; the efforts of Albert Cuny, Hermann Möller, and, most recently, Linus Brunner deserve mention in particular. Even though some striking similarities have been revealed, however, the previously attempted comparisons have by and large been unconvincing for several reasons. In the first place, the phonological system traditionally reconstructed for Proto-Indo-European differs drastically from that traditionally reconstructed for Proto-Afroasiatic. This has made it difficult to establish convincing sound correspondences

with the result that many lexical look-alikes have been taken to be cognates when they are not, while true cognates have gone undetected. Now that the reconstructed Indo-European stop system has been thoroughly revised by Gamkrelidze, Hopper, and Ivanov, the differences between the Indo-European and Afroasiatic phonological systems have been considerably reduced, and it is possible, at long last, to make a meaningful comparison between these two hypothetical proto-languages. Next, there appear to be relatively few similarities in the morphology of Proto-Indo-European and Proto-Afroasiatic. In my opinion, we should not expect to find many similarities in the morphology of these two proto-languages. As I see the situation, Proto-Afroasiatic and pre-Indo-European parted many millennia before the stage of development that can be reached by a direct comparison of the extant daughter languages. It was during this span of time between the separation of Proto-Afroasiatic and pre-Indo-European and the emergence of the historically-attested daughter languages that each proto-language developed its own, distinctive morphological system. Under these circumstances, I do not think that we will be able to recover the morphological system of the ancestor of these two proto-languages in great detail. The most that we can hope for is the recovery of broad similarities. Morphological issues are generally not discussed in the present paper (but cf. §3.51).

3.2. *Comparison of Indo-European and Semitic Phonological Systems:*

In the first two parts of this paper, we established the fact that the consonant systems of both Proto-Indo-European and Proto-Semitic belonged to the same linguistic type, each having a three-way contrast of voiced ~ voiceless (aspirated) ~ glottalized consonants. Similarly constituted phonological systems are rather widespread among the languages of the world, being found, for example, in the Caucasian languages, many American Indian languages, and several sub-Saharan African languages (for details, cf. the phonological systems given in Ruhlen 1976).

3.3. *Proto-Semitic/Indo-European Correspondences:*

New PSem.	Trad. PSem.	New IE	Traditional Indo-European	New PSem.	Trad. PSem.	New IE	Traditional Indo-European
b	b	b	bh	g	g	g	ǵh; gh
p	p	p	p, ph	k	k	k	ḱ, ḱh; q, qh
				k'	ḱ	k'	ǵ; g
d	d	d	dh	g	g	g ^w	g ^w h
t	t	t	t, th	k	k	k ^w	q ^w , q ^w h
t'	ṭ	t'	d	k'	ḱ	k' ^w	g ^w
ḍ	ḍ	d	dh	ɣ	ḡ	ḡh	ǵ ²
ṭ	ṭ	t	t, th	x	ḥ	ḥh	ǵ ²
ṭ'	ṭ̣	t'	d	ʕ	ʕ	ʕh	ǵ ²
dz	z	d	dh	ḥ	ḥ	ḥh	ǵ ²
ṭs	s	t	t, th	ʕ	ʕ	ʕ	ǵ ³
ṭs'	ʃ	t'	d	ḥ	ḥ	x	ǵ ³
				ʔ	ʔ	ʔ	ǵ ¹
dz	z	g	ǵh; gh	h	h	h	ǵ ⁴
ṭs	s	k	ḱ, ḱh; q, qh	y	y	y	y
ṭs'	ʃ	k'	ǵ; g	w	w	w	w
				m	m	m	m
s	s	s	s	n	n	n	n
š	š	s	s	l	l	l	l
ʔ	ʔ	k	ḱ, ḱh; q, qh	r	r	r	r
ʔ'	ḍ̣	k'	ǵ; g				

3.4. *Bilabials:*

The Proto-Semitic voiced and voiceless (aspirated) bilabial stops have exact counterparts in the Indo-European voiced (aspirated) and

voiceless (aspirated) bilabials. Note that the lack of an emphatic (i.e., glottalized) bilabial stop in Proto-Semitic is matched by the corresponding lack of a glottalized bilabial stop in Indo-European. The missing member is the traditional plain voiced bilabial (**b*) reconstructed analogically for Indo-European. As pointed out by Greenberg (1970:127), it is common for languages having ejectives to have a gap in the bilabial series.

3.5. *Dentals, Velars, Glides, Nasals, and Liquids:*

The dental and velar stops, as well as the glides, nasals, and liquids, correspond member for member and require no further comment.

3.6. *Palato-Alveolar Affricates:*

The palato-alveolar affricates (the traditional interdentals) of Proto-Semitic correspond to dental stops in Indo-European. Ancient Egyptian also has palato-alveolar affricates here, and all indications are that this was the original realization of this series in Proto-Afroasiatic (for discussion and references, cf. §2.6). Two explanations are possible to account for this correspondence: (1) Indo-European retained the original value, and the palato-alveolar affricates of Afroasiatic were secondarily derived from earlier dental stops through palatalization, or (2) Afroasiatic had the original value, and the Indo-European developments are secondary. Typological considerations favor the second alternative¹². In general, a contrast between velars and labialized velars, such as posited for Indo-European by Lehmann (1952:§2.1b and §13.3) and Meillet (1964:91-5), for example, implies a frontal contrast of some kind. One very common realization

¹²We cannot, however, exclude the possibility that some cases of palato-alveolar affricates in Proto-Semitic were secondarily derived through palatalization of earlier dentals.

of the frontal contrast is as some sort of affricate (cf. Ruhlen 1976 for examples). Therefore, I tentatively assume that pre-Indo-European possessed a series of palato-alveolar affricates corresponding to those of Proto-Semitic and that this series was later eliminated through occlusivization and merger with the dental stops (as has happened, for example, in the case of Aramaic [cf. §2.6]).

3.7. *Dental Affricates:*

The Proto-Semitic dental affricates correspond both to the dental stops and to the velar stops of Indo-European. According to Vergote (1971:44), some of the Common Semitic velars have undergone a palatalization to dental affricates. Early Egyptian has also participated in the palatalization of velars (cf. Vergote 1971:44). Palatalization of velars is a widespread phenomenon, and numerous typological parallels exist: from Indo-European, one can cite the Romance and Slavic developments as examples. In Proto-Semitic, the newly-formed dental affricates merged with previously existing dental affricates. In Egyptian, however, the developments were slightly different. The original dental affricates of Proto-Semitic have the following correspondences in Egyptian:

Proto-Semitic		Egyptian
$\underset{(\text{)}}{\text{dz}}$	=	z
$\underset{(\text{)}}{\text{ts}}$	=	$\underline{\text{t}}$
$\underset{(\text{)}}{\text{ts}'}$	=	$\underline{\text{d}}$

However, when the Proto-Semitic dental affricates are derived from earlier velars, the Egyptian correspondences are as follows:

Afroasiatic		Proto-Semitic	Egyptian
g	>	$\underset{(\text{)}}{\text{dz}}$	$\underline{\text{d}}$
k	>	$\underset{(\text{)}}{\text{ts}}$	$\underline{\text{t}}$
k'	>	$\underset{(\text{)}}{\text{ts}'}$	$\underline{\text{d}}$

That the Cushitic languages did not participate in this palatalization is shown by the fact that Beja *g* corresponds to Eg. *ḡ* and PS *ṭs'* (traditional *ṭ*), all three being from original **k'* (cf. Vergote 1971:44). The dual origin of the Proto-Semitic dental affricates explains why this series corresponds both to dental stops and to velar stops in Indo-European. Where the Proto-Semitic dental affricates correspond to velar stops in Indo-European, as Beja, may be presumed to have preserved the original value. Where the Proto-Semitic dental affricates correspond to dental stops in Indo-European, two explanations are possible: (1) the original value was preserved in Indo-European, and the Semitic developments were due to the palatalization of earlier dental stops, or (2) Proto-Semitic preserved the original value, and Indo-European somehow eliminated the dental affricates that must have existed in pre-Indo-European. The second alternative is the most probable. The following developments may be posited: The earliest form of pre-Indo-European had both dental affricates and palato-alveolar affricates as well as dental stops. The first change to take place was the merger of the dental affricates with the palato-alveolar affricates. At a later date, the palato-alveolar affricates underwent occlusivization and merged with the dental stops. All of this is, of course, highly speculative and, while extremely attractive and quite plausible, difficult to prove with the available evidence. Nonetheless, since I can find no more reasonable explanation, this is the one adopted here.

3.8. *Sibilants:*

Both the voiceless palato-alveolar sibilant and the voiceless dental sibilant of Proto-Semitic correspond to the voiceless dental sibilant of Indo-European. It is probable that pre-Indo-European originally distinguished these two sounds.

3.9. *Fricative Laterals:*

The fricative laterals of Proto-Semitic correspond to velar stops in Indo-European. It is not impossible that the earliest form of pre-Indo-European also had either fricative laterals or, more likely, lateralized affricates (as posited for Proto-Semitic by Cohen 1968:1304-5 and Martinet 1975[1953]:248-61). Steiner (1977:40), quoting Trubetzkoy, mentions that the development of lateralized affricates into palatal, velar, or uvular stops (or affricates) is a common development in the Northeast Caucasian languages; thus:

*tɬ	>	*kɬ	>	*kx	>	k
voiceless		voiceless		voiceless		voiceless
alveolar		velar		velar		velar
lateralized		lateralized		affricate		stop
affricate		affricate				

A similar shift may be posited for pre-Indo-European.

3.10. *Labialized Velars:*

The labialized velar stops of Indo-European correspond to plain velar stops in Proto-Semitic. There is some evidence that the Afroasiatic parent language may also have had labialized velars (cf. Cohen 1968:1303; Cohen 1947:129-30). If this were indeed the case, as seems entirely probable, the labialized velars would then have been lost in Proto-Semitic through delabialization and merger with the plain velars. A typological parallel exists with the Indo-European antecedent of the satem languages, where earlier labialized velars had been delabialized and had merged with plain velars (cf. §1.5; Meillet 1964:91-5).

3.11. *Uvulars:*

Diakonoff (1974:595) seems to be suggesting the existence of a series of uvular or postvelar stops in the Afroasiatic parent language when he says that "...all postvelar stops were lost" in the Semitic

branch and that in Egyptian "...the original lateral sounds were lost as well as the *postvelar stops* and labialized velars..." (the italics are mine). Uvulars have also been posited for Indo-European by several scholars, the most recent being Rudolf Normier (1977:174-5). In my opinion, these theories have a great deal of merit. However, since I do not at present believe that there were more than two guttural series -- velars and labialized velars -- at the time that Indo-European began to split up into the non-Anatolian dialect groups, the uvulars, if they ever existed, must have been lost at some time prior to the latest period of development, "Disintegrating Indo-European". I would very cautiously set up a series of plain and perhaps even labialized uvular stops for pre-Indo-European and possibly "Stress Indo-European" but not for subsequent periods.

3.12. *Laryngeals:*

The correspondences between Indo-European and Afroasiatic point to a complicated history for this series. While most of the developments can be accounted for, there remain several annoying problems. The following correspondences exist:

Indo-European	Proto-Semitic	Egyptian
ḡ ₁	ʔ	ʔ, ʔ
ḡ ₄	h	h
ḡ ₂	ḥ, ʕ, x, ɣ	ḥ, ḥ, ḥ, ʕ
ḡ ₃	ḥ, ʕ	ḥ, ʕ

We may assume that Proto-Afroasiatic had only the following four laryngeals: /ʔ, h, ḥ, ʕ/. I agree with Cohen (1968:1306) that Proto-Semitic /x/ and /ɣ/ are to be derived from earlier /ḥ/ and /ʕ/ respectively. Colarusso (this volume) cites examples from the Northwest Caucasian languages in which pharyngeal fricatives have developed into velar fricatives thus: /ḥ/ > /x^D/ (voiceless pharyngealized velar fric-

ative) > /x/ and /ʕ/ > /ɣ^o/ > /ɣ/. A similar progression may be posited for pre-Proto-Semitic. Likewise, pre-Egyptian had only /h/ and /ʕ/. /h/ early split into *h* and *ḥ*, and these two were later palatalized to *ḥ* in certain environments (cf. Diakonoff 1965:23, fn. 32).

The Indo-European developments can also be accounted for by setting up four laryngeals for pre-Indo-European¹³: /ʔ, h, ḥ, ʕ/. The earliest change that took place must have been a split of /h/ into /h/ and /x/ and of /ʕ/ into /ʕ/ and /ɣ/¹⁴. As in Semitic, the velar fricatives were considerably less frequent in occurrence than the pharyngeal fricatives. The development of velar fricatives may, for the sake of argument, be assigned to the Stress Indo-European period. What is certain here is that it would have had to have taken place prior to the Pitch Indo-European period. Thus, the following laryngeals existed at the end of the Stress Indo-European period: /ʔ, h, ḥ, ʕ, x, ɣ/.

In the Pitch Indo-European stage of development, qualitative vowel gradation came into being when the vowels *a* and *ā* developed pitch-conditioned front and back allophones. As noted in §1.6, the laryngeals *ʔ*₄ and *ʔ*₂ prevented the fronting of a contiguous *a* with high pitch. If we take *ʔ*₄ to have been the voiceless glottal fricative /h/, we can easily explain the Indo-European developments since typological parallels exist with the Northwest Caucasian languages where /h/ (and /hʷ/)

¹³The question of whether or not labialized laryngeals should be reconstructed for Indo-European will not be discussed here even though there is at least circumstantial evidence that one or more labialized laryngeals may have existed in the Indo-European parent language. Furthermore, there is even some evidence that Indo-European may also have had labialized dentals and sibilants.

¹⁴At the same time, some pharyngeals may have developed pharyngealized uvular allophones. Colarusso (this volume) mentions that such a development has occurred in several of the Northwest Caucasian languages. These pharyngealized uvulars eventually became plain uvulars, and, much later, the uvulars themselves were lost through merger with the plain velars. Some such development would help to explain the existence of forms such as Lat. *costa* "rib" and OCS. *kostv* "bone" beside Hitt. *ha-aš-ta-i* "bone", etc. (cf. Pokorny 1959:616 and 783).

lowers contiguous vowels and also causes compensatory vowel lengthening when lost (cf. Colarusso 1975:396). Therefore, typological evidence as well as the comparison with Afroasiatic confirm that the chief allophone of Ɂ_4 was the voiceless glottal fricative /h/. Hopper (1977a:49-50) and Lehmann (1952:108) arrive at essentially the same conclusion and so, it would seem, does Sturtevant (1951:§76).

The value of Ɂ_2 can also be determined with the aid of typological evidence. We know that Ɂ_2 corresponds to both the voiceless and voiced pharyngeal fricatives of Proto-Afroasiatic. Therefore, we can say with some confidence that the earliest forms of Ɂ_2 must have been the voiceless and voiced pharyngeal fricatives /ħ/ and /ʕ/ respectively. However, as made clear by Colarusso (this volume), pharyngeals, being [-low], do not lower contiguous vowels. Therefore, I follow Colarusso in assuming that the earlier pharyngeal fricatives /ħ/ and /ʕ/ developed into the multiply articulated pharyngeal/laryngeal fricatives /ħħ/ and /ʕʕ/ respectively in Pitch Indo-European¹⁵. Colarusso cites a parallel development in the Ashkharwa dialect of Abkhaz. These pharyngeal/laryngeals, being [+low], prevented the fronting of ɛ to e at the time of the changes that brought about the (morpho)phonemicization of qualitative ablaut. Reflexes of these pharyngeal/laryngeal fricatives survived in Hittite and the other older Indo-European languages of ancient Anatolia where they are written $\text{ḫ}(\text{ḫ})$.

It is more difficult to determine the value(s) of Ɂ_3 than of any of the other laryngeals. That at least two sounds underlie Ɂ_3 is clear from the Afroasiatic correspondences. It was to account for Ɂ_3 that I posited the development of the velar fricatives /x/ and /ɣ/ in the Stress Indo-European period. I chose velar fricatives because these sounds do not color contiguous vowels (cf. Colarusso this volume)¹⁶,

¹⁵These developments occurred at a later time than and were totally distinct from the changes that caused the phonemicization of the voiceless and voiced velar fricatives.

¹⁶I follow Sturtevant (1942:§9b and 1951:§75) in assuming that Ɂ_3 , like Ɂ_1 , did not color contiguous vowels.

because these are precisely the types of sounds that we would expect, and because these sounds can be derived from earlier pharyngeal fricatives. Reflexes of these velar fricatives also survived in Hittite, Cuneiform and Hieroglyphic Luwian, and Palaic.

The Semitic correspondences prove that Couvreur (1937:264) and Sturtevant (1942:§6c) were correct in their interpretation of ḫ as a glottal stop. Additional confirmation is provided by Skt. *pībati* "drinks", Lat. *bibit*, and OIr. *ibid*. The Indo-European antecedent would have been $*pī-p\text{ḫ}_1\text{-eti}$ $*/pīp\text{ḫ}eti/$. According to Gamkrelidze-Hopper-Ivanov, glottalized stops become voiced stops in Sanskrit, Latin, and Old Irish. Therefore, we would expect $/p\text{ḫ}/$ to become b in these languages, and this is exactly what we do in fact find.

We may set up the following matrix:

	ʔ	h	ḫḫ	ḫḥ	x	γ
e-coloring	+	-	-	-	+	+
a-coloring	-	+	+	+	-	-
preserved in Anatolian	-	-	+	+	+	+

In Late Indo-European, $/ʔ, h, x, \gamma/$ were lost initially before vowels, while $/\text{ḫḫ}/ > /h/$ and $/\text{ḫḥ}/ > /ḥ/ > /h/$ in the same environment. In Disintegrating Indo-European, all laryngeals first merged into $/h/$. $/h/$ (from earlier $/\text{ḫḫ}/$ and $/\text{ḫḥ}/$) was then lost initially before vowels (except in pre-Proto-Armenian) and medially between an immediately preceding vowel and an immediately following nonsyllabic. This latter change caused the compensatory lengthening of preceding short vowels:

iHC	>	$\bar{i}C$
eHC	>	$\bar{e}C$
aHC	>	$\bar{a}C$
oHC	>	$\bar{o}C$
uHC	>	$\bar{u}C$

Finally, I assume that the single remaining laryngeal, *h*, was preserved in all other positions and that it had a syllabic allophone when between two nonsyllabics.

3.13. *Examples:*

Even though this paper is entitled "Indo-European and Afroasiatic", the overwhelming majority of the following examples are from Semitic. The Semitic languages, of course, form only one branch of the Afroasiatic language family, the other branches being Ancient Egyptian, Berber, Chadic, Cushitic, and Omotic. However, the comparison of Indo-European directly with Semitic is the only one that can reasonably be made at the present time due to the fact, noted by Hodge (1971:10), that the other branches of Afroasiatic have not yet been sufficiently studied to permit the full reconstruction of the Afroasiatic parent language. No doubt, the collection and analysis of more data from the remaining branches of Afroasiatic will necessitate a reassessment of many of the conclusions reached in this paper.

3.14. *PS b = IE b:*

- | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>A. PS <i>*b-</i> "in, at, on, with"</p> <p>Hebr. <i>bə-</i> "in, at, on, with"</p> <p>Ar. <i>bī</i> "in, within, among"</p> <p>Ug. <i>b-</i> "in, within, among"</p> <p>ESA <i>b</i> "from, of"</p> <p>Eth. <i>ba</i> "in, at"</p> | <p>IE <i>*bi</i> (<i>*bhi</i>) "from, with, by, at"</p> <p>Goth. <i>bī</i> "by"</p> <p>Gk. suffix <i>-φι</i>; <i>ἀμφι</i> "on both sides, around"</p> |
| <p>B. PS <i>*bdk'</i> "to penetrate, split"</p> <p>Hebr. <i>beṣeq</i> "breach, fissure"</p> <p>Aram. <i>beṣaq</i> "to penetrate, split"</p> <p>Ug. <i>bdqt</i> "openings, sluices"</p> <p>Akk. <i>badāqu</i> "to cleave, split"</p> <p>Eth. <i>bedeq</i> "fissure"</p> | <p>IE <i>*bed-</i> (<i>*bhedh-</i>) "to prick, dig, pierce"</p> <p>Hitt. <i>pīd-da-i</i>, <i>pād-da-i</i> "to dig"</p> <p>Lat. <i>fodiō</i> "to dig"</p> <p>Lith. <i>bedū</i> "to dig, bury"</p> <p>Welsh <i>bedd</i> "grave"</p> <p>Gaul. <i>bedo-</i> "canal, ditch"</p> <p>OCS. <i>bodq</i> "to stick, prick"</p> |

- C. PS **bhl* "to say, speak" IE **bah-* (**bhā-*) "to say, speak"
- Ar. *bahala* "to curse"
 Akk. *bālu* "to implore"
 Eth. *bəhla* "to say, speak"
 Har. *bāya* "to say, name"
 Mh. *behlît* "thing"
- Gk. (Dor.) *φαμλ* "to declare, make known"
 Lat. *fārī* "to say, speak"
 OE. *bōian* "to boast"
 Russ. Ch. Sl. *bajati* "to tell, heal"
- D. PS **bhr* "to shine" IE **bah-* (**bhā-*) "to shine"
- Hebr. *bāhîr* "bright, brilliant, clear"
 Ar. *bahara* "to glitter, shine"
 Aram. *bəhar* "to shine"
- Skt. *bhāti* "to shine"
 Gk. *φάω* "to give light, shine";
φᾶνός "light, bright, joyous";
φαίνω "to bring to light, make clear; to show, appear";
φᾶος, φῶς "light"
 OIr. *bán* "white"
 OE. *bōnian* "to polish"
- PS **bhw* "to be beautiful, shining, brilliant"
- Ar. *bahā* "to be beautiful";
bahīy "beautiful, splendid, brilliant, radiant, shining"
- OIr. *bán* "white"
- PS **bhg* "to be glad, happy"
- Ar. *bahiġa* "to be glad, happy";
bahūġa "to be beautiful";
bahġa "splendor, beauty, magnificence"
- PS **bhk'* "to shine, be white"
- Hebr. *bōhaq* "a harmless eruption on the skin, vitiligo"
 Aram. *bəhaq* "to shine"
 Ar. *bahaq* "herpetetic eruption, a mild form of leprosy"
- E. PS **br?* "to bear, bring forth, create" IE **ber-* (**bher-*) "to bear, carry, bring forth"
- Hebr. *bārā'* "to shape, create"
 Aram. *bərā'* "to create"; *bar* "son"
 Ar. *bara'a* "to create"
 Soq. *bere* "to bring forth";
bar "child"
- Skt. *bhāratī* "to bear, support"
 Arm. *berem* "to bear"
 Gk. *φέρω* "to bear, carry, bring forth"
 Alb. *bir* "son"; *burrë* "man"
 Lat. *ferō* "to bear, carry, bring forth"
 Goth. *bairan* "to bear, carry, bring forth"
- Eg. *bry* "young"

- bring forth"; *barn* "child";
baur "son, child"
 Lith. *bérnas* "son"
 OIr. *bíru* "to carry"
- F. PS **bk'ʕ* "to cleave"
 Hebr. *bāqa'* "to cleave, break
 open or through"
 Aram. *beqa'* "to cleave"
 Ug. *bq'* "to cleave"
 PS **bk'r* "to split open"
 Ar. *baqara* "to split open, rip
 open, cut open"
 Hebr. *bāqar* "to inquire, seek"
- IE **bek'-* (**bheg-*, **bheng-*) "to
 break"
 Skt. *bhanákti* "to break, shatter"
 Arm. *bekanem* "to break"
 OIr. *bongid* "to break, reap"
- PS **bak'-* (**bhag-*) "to divide,
 distribute"
 Skt. *bhájati* "to divide, distrib-
 ute, receive, enjoy"
 Gk. φαγεῖν "to eat, devour"
 Toch. A *pāk*, B *pāke* "part, portion"
- G. PS **bnt'* "to bind"
 Hebr. 'aḥnēṭ "girdle"
 Eg. *bnd* "to tie, bind"
- IE **bend-* (**bhendh-*) "to bind"
 Skt. *badhnāti* "to bind"; *bandhā-s*
 "bond"
 Goth. *bīndan* "to bind"
- H. PS **br-* "grain"
 Hebr. *bar* "grain, corn"
 Ar. *burr* "wheat"
 Eg. *bʕ.t* "a kind of grain"
 Som. *bur* "wheat"
- IE **bares-* (**bhares-*) "grain"
 Lat. *far* "spelt, grain"
 OIce. *barr* "barley"
 OE. *bere* "barley"
 OCS. *brašbno* "food"
- I. PS **brm* "to twist, turn, weave"
 Hebr. *berōmīm* "variegated
 cloth"
 Akk. *birmu* "a kind of clothing"
 Ar. *barāma* "to twist, twine";
barīm "rope, string, cord,
 twine"
- IE **ber-* (**bher-*) "to plait, braid,
 twist, weave"
 Gk. φάρος "a large piece of cloth,
 web; cloak; mantle"; φορηός
 "a seaman's cloak; mat"
 Lith. *būrvā* "a piece of clothing";
būrė "sail"
- J. PS **bst'* "to spread out"
 Ar. *basata* "to spread, spread
 out, enlarge, expand"
 Eg. *bs*, *bsy* "to grow up, swell";
bsyt "boil"; *bss* "pus"
- IE **bes-* (**bhes-*) "to scatter,
 spread, strew; expand, puff
 up, blow"
 Skt. *bhāśman-* "ashes"; *bhāstrā*
 "leather bottle, skin, bag"
 Gk. φῦχω "to breathe, blow"

- K. PS **bʷ?* "to come, enter, go in" IE **beu-* (**bheu-*, **bhewə-*) "to become, be, exist, live, stay, abide"
- Hebr. *bō'* "to come in, come, go in, enter"
- Ar. *bā'a* "to come back, return, reside, live, settle down"; *mabā'a* "abode, dwelling"
- Oakk. *būā'um* "to come"
- Ug. *bā* "to come"
- Har. *bō'a* "to enter, go in"
- Eg. *bw* "place, position"
- Beja *bi'* "to return home, rest"
- L. PS **bll* "to overflow, pour over"
- Hebr. *bālal* "to mingle, mix, confuse, anoint"
- Phoen. *bl* "a type of offering"
- Ar. *balla* "to moisten, wet, make wet"; *billa*, *balal* "moisture, humidity"
- Oakk. *balālum* "to pour out"
- Tigre *balal* "to be full, overflow, flow"
- PS **bl-bl-* "to confuse"
- Ar. *balbala* "to disquiet, make uneasy, confuse"; *balbāl* "anxiety, uneasiness, concern"
- PS **blγ* "to reach, arrive, ripen"
- Ar. *balağa* "to reach, arrive, come, attain puberty, ripen, mature"
- Hebr. *bela'* "slander, calumny"
- IE **bel-* (**bhel-*) "to swell, puff up, inflate, expand, bubble up, overflow"
- Gk. *φαλλός* "penis"
- Lat. *foliis* "leather bag, bellows, puffed-out cheeks"
- OE. *bolla* "bowl"; *beald* "bold"
- IE **bleE-* (**bhlē-*) "to blow"
- Lat. *flō* "to blow"
- OE. *blāwan* "to blow"; *blād* "blowing, breath"
- OHG. *blāsen* "to blow"
- IE **bleE-*, **bloE-* (**bhlē-*, **bhlō-*, **bhlē-*) "to blow, blossom, sprout"
- Gk. *φύλλον* "leaf"
- Lat. *folium* "leaf"
- Toch. A *pālt*, B *pīlta* "leaf"
- Goth. *blōma* "flower"
- OE. *blōwan* "to bloom, flower"
- IE **belg-* (**bhelǵh-*) "to swell"
- Ir. *bolg* "belly, bag"
- Goth. *balgs* "skin"
- OE. *bielg*, *bylig* "leather bag"
- IE **blet'-* (**bhlēd-*) "to boil over"
- Gk. *φλέδων* "a babbler"
- Lett. *blādu* "to babble"

IE **blek*^w- (**bhleg*^w-) "to puff up, swell, inflate, expand"

Gk. φλέψ "vein"

OHG. *bolāa*, *bulchunna* "a round swelling"

IE **blei*- (**bhle*-) "to swell, expand, overflow"

OE. *blegen* "boil, ulcer, blister"

OIce. *blīstra* "to whistle"

Gk. φλιδάω "to overflow with moisture, be ready to burst"

IE **bleu*- (**bhleu*-) "to overflow, pour over, flow"

Gk. φλέω "to abound, teem with abundance"; φλύω, φλύζω "to boil over, bubble up"; φλυδάω "to become soft or flabby"; φλύκταινα "blister"; φλυᾶρία "silly talk, nonsense, foolery"

Lat. *fluō* "to flow"

M. PS **bly* "to become worn out"

IE **bel*- (**bhel*-) "worn out, weak; misfortune, calamity"

Hebr. *bālāh* "to become old and worn out"; *bāleh* "worn out"; *bēlī* "destruction, defect, failure"

Gk. φλαῦρος "bad, useless, mean, shabby"

Aram. *bēlē* "to become worn out"

Goth. *balwjan* "to torment, plague"; *blauþjan* "to abolish, make void"

Ar. *balīya* "to be or become old, worn"; *balīy* "worn, decrepit, old, shabby"; *balīya* "trial, tribulation, affliction, distress, misfortune, calamity"

OE. *bealo* "evil, calamity, injury"; *blēat* "miserable"

OIce. *blauþr* "soft, weak"

OCS. *bolēti* "to be sick"

Lith. *blúkšti* "to become weak"

Tigre *balā* "to be old, worn out"

N. PS **blg* "to shine"

IE **bel*- (**bhel*-) "shining, white"

Hebr. *bālay* "to gleam, smile"

Skt. *bhāla-m* "forehead"

Ar. *balaḡa* "to shine, dawn"; *balīḡa* "to be happy, glad"

Gk. φαλός "shining, white"

OCS. *bělъ* "white"

Lith. *bālas*, *bāltas* "white"

- PS **blbts'* "to gleam, glitter"
- NSyr. *balbis* "to gleam, glitter"
- IE **belk'-, *blek'-* (**bheleg-*)
"to shine"
- Skt. *bhārgas-* "splendor, radiance"
- OCS. *blagv* "good"
- Gk. *φλέγω* "to burn, blaze"
- Lat. *flagrō* "to blaze, burn, glow"; *fulgor* "lightning"
- OE. *blæcern, blācern* "lantern"
- IE **bleEi-* (**bhlēi-*, **bhlēi-*,
**bhlī-*) "to shine"
- OE. *blēo* "color, appearance, form";
blīcan "to shine, glitter";
blāc "bright, white"
- OCS. *blědvo* "light green, yellow"
- IE **bles-* (**bhles-*) "to shine"
- OE. *blæse* "torch, fire"
- IE **bluH-* (**bhlēu-*, **bhləu-*,
**bhlū-*) "to shine"
- Pol. *blysk* "lightning"
- IE **bleus-* (**bhleu-s-*) "to shine, burn"
- OE. *blýsa* "torch, fire"
- Czech *blýskati* "to shine"
- IE **bleE-wo-s* (**bhlē-wo-s*)
"golden-yellow"
- Lat. *flāvus* "golden-yellow"
- OHG. *blāo* "blue"
- O. PS **brk'* "to shine, be bright"
- Hebr. *bāraq* "to flash"; *bārāq*
"lightning"
- Aram. *barqā* "lightning"
- Ug. *brq* "lightning"
- Ar. *baraqa* "to shine, glitter, sparkle"; *barq* "lightning"
- Akk. *bīrqu* "lightning"
- Har. *berāq* "lightning"
- IE **berHk'-, *breHk'-* (**bhereǵ-*,
**bhrēǵ-*) "to shine, be bright"
- Skt. *bhrājate* "to shine, gleam, glitter"
- Lith. *brėkšti* "to dawn"
- Goth. *bairhts* "bright"
- Hitt. *pār-ku-iš* "pure, clean"
- Welsh *berth* "beautiful"

Eg. *brg* "to give light"

IE **breHk-* (**bhrēk-*) "to shine"

PS **br̥r* "to be or become clear
or bright; to purify,
clean"

Skt. *bhr̥śate* "to shine, glitter"

Hebr. *bārār* "to purify"; *bar*
"pure, clean"

Akk. *barāru* "to be or become
clear, bright, shining;
to shine, gleam"

Ug. *br̥r* "clean"

Amh. *bār̥ra* "to burn, be lit";
abār̥ra "to be aglow,
shine"; *bər̥ra* "clear
weather"

P. PS **brw/y* "to swell, puff up"

IE **bar-*, **ber-* (**bhar-*, **bher-*)
"to swell, expand, puff up,
bristle"

Akk. *barū* "to be puffed up,
fat, swollen"

Hebr. *bārā'* "to be fat"

Skt. *bhr̥ṣṭi-s* "point, spike"

OIce. *barr* "pine-needles"

PS **br̥tš* "cypress, pine"

OE. *byrst* "bristle"; *breord*

"brim"; *brord* "point"

Akk. *burāšu* "pine"

OCS. *borv* "spruce, fir"

Hebr. *berōš* "cypress, pine"

OIr. *baingen* "bread"

Aram. *berōθ* "cypress, pine"

Russ. *boršč* "hogweed"

Lat. *fermentum* "leaven, yeast"

PS **br̥d̥z* (< **br̥g*) "to stand
out, protrude"

IE **bardaA* (**bhardhā*) "beard"

Ar. *baraza* "to show, appear,
come into view, emerge;
to jut out, protrude, be
prominent, stand out"

Lat. *barba* "beard"

OS. *barda* "beard"

OCS. *brada* "beard"

PS **br̥f* "to expand, surpass"

IE **berm-*, **brem-* (**bherem-*)
"to bristle"

Ar. *bara'a* "to surpass, excel";
bar'ama "to bud, burgeon,
sprout"

OHG. *brāmma* "brier"

OIce. *barmr* "brim"

OE. *brōm* "broom (plant)"

PS **br̥t'* "to germinate, sprout"

IE **breu-* (**bhreū-*) "to bubble
up, boil, seethe"

Ar. *baraḍa* "to germinate,
sprout"

Skt. *bhurvāni-s* "restless, ex-
cited"

Eg. *br̥br* "to boil over"

Lat. *ferveō*, *fervō* "to boil,
seethe"

MIr. *berbaim* "to boil"

OE. *brēowan* "to brew"

OIce. *brauð* "bread"

IE **breus-* (**bhreus-*) "to swell"

OE. *brēost* "breast"

OIr. *brú* "belly"

IE **berg-* (**bherǵh-*) "to be prominent, high"

Skt. *bṛhánt-* "high, tall, great"

Arm. *barjr* "high"

OE. *beorh*, *beorg* "hill, mountain"

Hitt. *pár-ku-uš* "high"

IE **brend-* (**bhrendh-*) "to puff up, swell"

Lith. *bręsti* "to ripen, mature"

Q. PS **br?* "to work with a sharp tool, scratch, cut, grate, bore"

IE **ber-* (**bher-*) "to work with a sharp tool, scratch, grate, cut, bore"

Hebr. *bārē* "to cut down, cut out"

Gk. *παράω*, *φάράω* "to plow"

Pun. *br* "engraver"

Lat. *forō* "to bore, pierce"

OE. *borian* "to bore, pierce"

PS **bry* "to trim, shape, sharpen, scratch off, scrape off"

IE **berd-*, **bred-*, **br̥d-* (**bher-edh-*) "to cut"

Ar. *barā* "to trim, shape, sharpen, scratch off, scrape off"

Skt. *bardhaka-s* "cut off"

OE. *bred* "board"; *bord* "board, plank"

PS **br̥dz* "to bore, pierce"

IE **breFi-* (**bhrēi-*, **bhr̥i-*) "to cut with a sharp tool"

Aram. *beraz* "to bore, pierce"

Skt. *bhrīnāti* "to injure, hurt"

Welsh *brīw* "wound"

PS **br̥d* "to file"

Russ. Ch. Sl. *brīju* "to shear, clip"

Ar. *barada* "to file"

Lith. *brėžti* "to scratch, sketch, design"

PS **br-br-* "to hollow out"

Amh. *boräbborä* "to hollow out, cut a groove"

3.15. PS p = IE p:

- A. PS **psw* "to fart" IE **pestʰ-* (**pezd-*) "to fart"
- Ar. *fasā* "to fart noisely"
 Har. *fās* "fart"
 Tuareg *fəzz* "fart"
 Bilin *faša* "to fart"
- Lat. *pēdō* "to fart"
 Gk. βδέω "to fart"
 Czech *pezd* "anus, fart"
- B. PS **hp̥* "to gather, collect" IE **h̥hop-* (**op-*) "to gather wealth; to be abundant, rich, wealthy"
- Hebr. *hāṣāś* "to search"
 Ar. *ḥafaša* "to gather wealth"
 Ug. *hp̥š* "to gather, collect"
 Eth. *ḥafaša* "to gather"
- Hitt. *ḥapzi* "to be abundant";
ḥappin-, *ḥappinant-* "rich"
- Lat. *opēs* "resources, means, wealth"; *Ops* "the goddess of abundance"; *opulens* (< **open-ont-*) "rich, wealthy"
- Skt. *āpnas-* "possession, property"
- PS **hpl* "to gather together"
- Ar. *ḥafala* "to gather, assemble, congregate; to flow copiously; to be replete, teem"; *ḥāfiḷ* "full, filled, replete, abundant, copious"
- C. PS **pr̥* "to surpass, outstrip, excel" IE **per-* (**per-*) "preceding, surpassing"
- Hebr. *peraʿ* "leader, prince"
 Ar. *faraʿa* "to surpass, outstrip, excel"
 Ug. *prʿ* "the best"
- Skt. *pāri* "around"
pāra-s "far, distant"
purās "in front, forward, before"
purati "to precede, go before"
prā- "before, in front"
prataraṁ "further"
prāti "towards, near to, against"
prathamā-s "foremost, first"
- Eg. *prī* "to go forth, go up";
pry "hero, champion";
prw "excess, surplus"
- Gk. περί "around"
 πέραν, πέρην "across, beyond, on the other side"
 παρά, παρὰ "beside"
 πᾶρος "before"
 πρό "before"
 πρότερος "before, in front of, forward"
 πρῶτος "first, foremost"
 πρόμος "chief, foremost man"

- πρόηα "forthwith"
 πρὸς, πρὸςτί "from"
 Lat. *per* "through, along, over"
prae "before, in front"
prō "before, in front of"
primus "first, foremost"
 Goth. *faur* "for, before"
frauja "master, lord"
fairra "far"
 OSax. *furist* "first, foremost"
furisto "prince"
 Lith. *priē* "at, near, with, by"
prō "through, past, by"
priēš "against"
 Hitt. *pa-ra-a* "forth"
pī-ra-an "before, forth"
- D. PS **pʔm* "to become full"
 Hebr. *pīmāh* "superabundance, fat"
 Ar. *fa'ama* "to fill, become full"; *fi'ām* "group"
- IE **poʔi-* (**pōi-*, **pī-*) "to swell, fatten"
 Skt. *páyate* "to swell, fatten, overflow, abound"; *pīvan-* "swelling, full, fat";
páyas- "milk"
 Gk. πῶν "fat, rich"
 Lith. *píenas* "milk"
- IE **poʔ(i)-* (**pō[i]-*) "to drink, swallow"
 Skt. *pāti*, *píbati*, *páyate* "to drink, swallow"; *pīyáte* "to drink"; *pítu-s* "juice, drink, nourishment, food"
 Gk. πῖνω, Lesb. πῶνω "to drink"
 Lat. *bibō*, *pōtō* "to drink"
 OCS. *piti* "to drink"
- E. PS **pry* "to bring forth, bear fruit"
 Hebr. *pārāh*, *pārā'* "to bring forth, bear fruit"; *pērē* "fruit"
 Akk. *pīr'u* "issue, offspring, descendant"
 Phoen. *pry* "to bear fruit"
 Ug. *pr* "fruit"
 Eth. *fəre* "fruit"
- IE **per-* (**per-*) "to bring forth, produce"
 Lat. *pariō* "to bear, bring forth"
 Lith. *perėti* "to hatch"

Eg. *pṛt* "fruit"
 Galla *firi* "fruit"

F. Eg. *pḍ* "knee, foot"

IE **petʰ-* (**ped-*) "foot"

Skt. *pad-* "foot"
 Gk. *πούς, ποδός* "foot"
 Lat. *pēs, pedis* "foot"
 Goth. *fōtus* "foot"
 Luw. *pa-ta-aš* "foot"
 Lyc. *pede-* "foot"

G. Eg. *pt* "to run, flee"

IE **pet-* (**pet-*) "to rush, fly, flee"

Skt. *pátati* "to fly, soar, rush, fall"
 Gk. *πέτομαι* "to fly"
 Lat. *petō* "to make for, go to, seek"

H. PS **prʰ* "to spread, scatter"

IE **per-* (**per-*) "to spray, scatter"

Hebr. *pāraś* "to spread, expand, stretch out";
pēraś "to stretch, spread, scatter"

Gk. *πρήθω* "to blow up, swell out"
 Skt. *pruṣṇóti* "to sprinkle, wet, shower"

Ar. *faraša* "to spread, spread out"

IE **perk-*, **prek-* (**perkʰ-*, **prekʰ-*)
 "scattered, spread out"

PS **prḍ* "to spread out, extend, stretch"

Skt. *pr̥śni-s* "spotted"
 Gk. *περυνός* "dark-colored"
 OIr. *erc* "speckled"

Ar. *farada* "to spread, spread out, extend, stretch"

IE **pers-* (**pers-*) "to sprinkle"

Hitt. *pa-ap-pár-aš-zi* "to pour, sprinkle"
 Skt. *pr̥ṣat* "drop of water"
 OIce. *fors* "waterfall"
 Czech *pršetí* "to sprinkle, rain, drizzle"
 Toch. A *pārs-* "to water, wet, sprinkle"
 Lith. *puškšti* "to besprinkle"

IE *(s)per- (*[s]per-) "to strew, scatter, spread"

Gk. σπείρω "to sow, scatter, strew"

OIce. *spræna* "to spirt, sprout"

OHG. *spreiten* "to spread"

IE *(s)perk'- (*[s]p[h]ereg-) "to scatter, strew"

Skt. *spṛhṛjati* "to burst forth"

Lat. *spargō* "to scatter, strew, sprinkle, pour forth"

OIce. *sparkr* "lively, sprightly"

I. PS *pl- "flat, level, broad"

Hebr. *pillēs* "to level, straighten out"; *peles* "balance, scale"

Akk. *palkū* "wide"

Ar. *faltāḥa* "to make broad; to broaden, flatten"; *filṭaḥ* "broad, flat"

Phoen. *pls* "level"

Ug. *plk* "wide overgarment"

IE *pel-, *plaA- (*pelə-, *plā-) "even, level, flat, wide, broad"

Hitt. *pal-ḫi-iš* "broad"

Skt. *pr̥thū-s* "broad, wide"; *práth-ati* "to spread, extend"

Gk. πλατός "wide, broad, flat, level"

Lat. *plānus* "even, level, flat"; *palma* "palm"

Lith. *plonas* "thin"; *plótas* "expanse, space"

Welsh *llydan* "wide, broad"

OIce. *flatr* "flat, level"

J. PS *pr- "heifer, calf"

Hebr. *par* "young bull, steer"; *pārāh* "heifer, calf"

Ar. *farqad* "calf"

Ug. *pr* "young cow"

Akk. *pūru* "young bull or calf"

IE *per- (*per-) "heifer, calf"

Skt. *pr̥thuka-s* "young animal"

Gk. πόρις, πόρις, πόρις "calf, heifer, young cow"

OE. *fearr* "bull"

Arm. *ort* "calf"

Eg. *pry* "ferocious bull"

K. PS *pḥm "to burn, char; charcoal"

Hebr. *peḥam* "coal, charcoal"

Ar. *faḥma* "to make black, char"; *faḥm* "charcoal, coal"

Akk. *pēntu* "(glowing) coal"

IE *pah̥hur (*pāwer, *pūr) "fire"

Hitt. *pa-aḫ-hur* "fire"

Gk. πῦρ "fire"

Umbr. *pīr* "fire"

OIce. *fūrr* "fire"

Toch. A *por*, B *puwār* "fire"

Czech *pýř* "glowing ashes, embers"

Phoen. *pḥm* "charcoal"
 Ug. *pḥm* "(glowing) coal"
 Eth. *fəḥəm* "charcoal"
 Har. *fəḥama* "to be red-hot"
 Amh. *fəḥ* "embers"; *famä* "to
 become glowing"

L. PS **pth* "to open, untie, loos-
 en"

Hebr. *pāṯaḥ* "to open, untie,
 loosen"
 Ar. *fataḥa* "to open"
 Aram. *pəṯaḥ* "to open"
 Akk. *pītū*, *petū*, *patū* "to
 open"

Phoen. *pth* "to open"
 Eth. *fatha* "to open"
 Ug. *pth* "to open"
 Har. *fātaḥa* "to untie, set
 free"
 Amh. *fätta* "to release, untie,
 unfasten, divorce"

Eg. *pth* "to open"

PS **pty* "to be open, wide"

Hebr. *pāṯāḥ* "to be open, wide,
 spacious"
 Aram. *pəṯā'* "to be spacious"

M. PS **prđ* "to separate, divide"

Hebr. *pāraḏ* "to separate, di-
 vide"; *pēraḏ* "to separate,
 disintegrate, loosen, de-
 compose"
 Har. *fārāda* "to judge"

PS **prk'* "to separate, divide"

Hebr. *pāraq* "to unload, deliver,
 set free, extricate"; *pēraq*
 "to break, remove, unload,
 dismantle, take apart"
 Ar. *faraqa* "to separate, part,
 divide, sever"
 Ug. *prq* "to separate"

IE **pet-* (**pet-*, **petə-*) "to open,
 spread"

Av. *paṣana-* "wide, broad"
 Gk. *πετάννυμι* "to spread out"
 Lat. *pateō* "to be open"
 OIce. *faðmr* "fathom"

IE **per-* (**per-*) "to separate,
 divide"

Hitt. *pār-ši-ya-as-zi* "to break,
 divide"
 Skt. *pūrtā-m* "gift, reward"
 Gk. *περάω* "to sell abroad"; *πορεῖν*
 "to furnish, present, offer"
 Lith. *pirkti* "to buy"
 Lat. *pār* "equal"; *pars* "part, por-
 tion, share"; *portiō* "part,
 section, division"
 OIr. *ramn* "part"

PS **prts* 'to break through'

Hebr. *pāraṣ* "to break, break through, demolish, erupt; to burst, spread, break out"; *pārūṣ* "crushed, cracked, broken through"

Ar. *faraṣa* "to break through"

Akk. *parāṣu* "to break through"

Phoen. *prṣ* "to break through"

Ug. *prṣ* "opening"

PS **prg* "to part, separate"

Ar. *faraḡa* "to open, part, separate, cleave, split, breach"

PS **prt* 'to divide into parts'

Hebr. *pāraṭ* "to change (money); to give details, itemize; to divide into parts"

Har. *fārāṭa* "to burst"

Eg. *prḏ*, *prt* "to separate";
prḥ "to divide, separate"

N. PS **plg* "to split, cleave, divide"

Ar. *falaḡa* "to split, cleave"

Hebr. *pālay* "to split, divide, separate"; *peley* "canal, channel"

Phoen. *plg* "to divide"

Akk. *palgu* "canal"

PS **plh* "to split, cleave"

Hebr. *pālah* "to cleave"; *peleh* "mill-stone"

Ar. *falaḡa* "to split, cleave, plow, till"

PS **plk* 'to split, cleave, break forth'

Ar. *falaḡa* "to split, cleave; to burst, break (dawn)"

IE **pleE(i)-* (**plē[i]-*) "to split, cleave, rend"

OIce. *flaska* "to split"; *flakna* "to flake off, split"

OE. *flēan* "to flay"

Lith. *plýšti* "to split, break, burst"

IE **(s)pel-* (**[s]p[h]el-*) "to split, cleave"

Skt. *phālati* "to split, cleave"

OHG. *spaltan* "to split, cleave"

IE **pels-* (**pels-*) "stone"

Gk. πέλλα (< *πελσα) "stone"

Skt. *pāṣyā* (< *parṣ-) "stone"

Pashto *parṣa* "stone"

OHG. *felis* "stone"

OIr. *ail* "rock"

Har. *fālāqa* "to hit the head
with a stone or stick so
that blood comes out"

Amh. *fālāqqāqā* "to split,
break loose"

PS **pl̥t* "to break through" >
"to escape"

Hebr. *pālaṭ* "to escape"

Ug. *pl̥t* "to be freed"

Phoen. *pl̥t* "to escape"

Har. *fālāṭa* "to split wood
with an axe"

Eth. *falaṭa* "to separate"

PS **pl̥s* "to split, cleave"

Ar. *fala'a* "to split, cleave"

PS **pl̥š* "to break open or
through"

Hebr. *pālaš* "to break open or
through"

Akk. *palāšu* "to dig a hole"

PS **pll* "to separate, divide"

Ar. *falla* "to dent, notch,
blunt; to break; to flee,
run away"

Hebr. *pālāl* "to arbitrate,
judge"

Eth. *falfala* "to break out,
burst, gush"

3.16. PS *d* = IE *d*:

A. Eg. *dī* "to give, set, place"

IE **deh₂-* (**dhē₂-*) "to set, put,
place"

Skt. *dādāhāti* "to put, place"

Gk. *τίθημι* "to set, put, place"

OCS. *děti* "to put, place"

Hitt. *da-a-i* "to put, place"

OE. *dōn* "to do, act, make"

- B. PS **dāl* "to dangle, hang, be low"
 Hebr. *dālāl* "to hang, dangle, be low"
 Akk. *dālālu* "to be weak, humble"
 Ug. *dāl* "to humiliate, look down upon"
 Ar. *daldala* "to set into a swinging motion, dangle";
dālā "to let hang, dangle; to hang, suspend"
- C. PS **dabk'* "to stick together, join"
 Hebr. *dāḅaq* "to adhere to, cling to"
 Aram. *dəḅaq* "to stick together, join"
 Ar. *dabiqa* "to stick, adhere"
- D. PS **drr* "to be strong, free, independent"
 Hebr. *dərōr* "freedom, liberty"
 Akk. *dārāru* "to be strong, free, independent"; *darru* "strong"; *darrūtu* "power, strength"
- IE **del-* (**dhel-*) "to dangle, swing"
 Arm. *doḷam* "to tremble, shake, quiver"
 Swed. dial. *dilla* "to swing, dangle"
 Low Germ. *dallen* "to dangle"
- IE **dab-* (**dhabh-*) "to fit together"
 Arm. *darbin* "smith"
 Lat. *faber* "skillful"
 Goth. *ga-daban* "to be fitting, happen"
 OE. *ge-dæfte* "gentle, meek"
 OCS. *dobro* "good"
 Lith. *dabinti* "to adorn, decorate"
- IE **der-* (**dher-*) "to be strong, solid, firm; to make strong, support, maintain"
 Skt. *dhārāyati* "to hold, bear, preserve, keep"
 Lith. *daryti* "to make"
 Toch. A *tsär* "hard"
- IE **derb-*, **dreb-* (**dherebh-*)
 "to make or become strong, solid, firm"
 Gk. *τρέφω* "to make to grow, rear, breed; to thicken, congeal, curdle; to become firm; to maintain, support"; *τρόφις* "well-fed, stout"
 OSax. *derbi* "strong, powerful"
 OIce. *ðjarfr* "bold, daring";
ðirfa "to dare"

- IE **ders-* (**dhers-*) "to be bold, dare"
- Skt. *dhṛṣú-s* "bold, courageous, strong"; *dhṛṣṇóti* "to dare, be bold"
- Gk. *θάρσος* "courage, boldness"
- OE. *ge-dyrstig* "bold, daring"
- Toch. A *tsraṣi* "energetic"
- Lith. *drįsti* "to dare"
- IE **derg-*, **dreg-* (**dhereǵh-*) "to be bold, strong"
- Skt. *dr̥hyati* "to be strong"
- OCS. *drožati* "to be bold"
- IE **dreug-* (**dhereugh-*) "to be solid"
- OIce. *driūgr* "solid, substantial"
- E. PS **dmr* "to flow copiously" IE **der-* (**dher-*) "to gush forth"
- Ar. *darra* "to flow, copiously" Skt. *dhārā* "flood, gush"
- Hebr. *derōr* "flowing" Gk. *θορός, θορή* "semen"; *θοῦρος* "rushing, raging"
- Ug. *dr* "to flow"
- F. PS **dwy* "to sound, resound" IE **dwen-* (**dhwēn-*) "to sound, resound"
- Ar. *dawā* "to sound, drone, echo, resound"; *dawīy* "sound, noise, drone, roar, echo, thunder"
- Skt. *dhvānati* "to sound"
- OE. *dynian* "to resound"; *dyne* "noise, loud sound"
- G. PS **dmn* "to be dirty, filthy" IE **der-* (**dher-*) "to be dirty, filthy"
- Ar. *darina* "to be dirty, filthy"; *darān* "dirt, filth"
- Lat. *fracēs* "dregs of oil"
- OIce. *dregg* "dregs, lees"; *drit* "dirt"
- OE. *drōsne* "dregs, dirt"; *deorc* "dark"; *dærste* "dregs, lees"
- Lith. *dérgti* "to become dirty"; *deřkti* "to make dirty"; *dargūs* "dirty, filthy"
- MIr. *derg* "red"

3.17. PS \dagger = IE \dagger :

- A. Eg. *tp* "to burn; flame, fire" IE **tep-* (**tep-*) "to burn, be hot"
 Skt. *tāpati* "to heat, make warm"
 Lat. *tepeō* "to be lukewarm"
 OIr. *té* "hot"; *ten* "fire"
 Hitt. *tapašša-* "fever"
- B. PS **trp* "to have enough, live in luxury" IE **terp-*, **trep-* (**terp-*, **trep-*) "to have enough, be satiated"
 Ar. *tarīfa* "to live in opulence, luxury"; *taraf* "affluence, opulence, luxury"
 Skt. *tṛpyati* "to become satiated"
 Gk. *τέρω* "to satisfy, delight, please; to be delighted, have enough"
 Har. *tārāfa* "to be in excess" Goth. *prafstjan* "to console, comfort"
 Amh. *tārrāfā* "to be left over, remain, be in excess, be superfluous"; *tərf* "profit, gain, excess" Lith. *taĩpti* "to thrive, grow luxuriantly"
- C. PS **tr-* "to shake violently" IE **tres-*, **ters-* (**tres-*, **ters-*) "to shake, tremble"
 Ar. *tartara* "to shake violently"
 Skt. *trāsati* "to tremble, quiver"
 Akk. pres. *itarrur* "to shake" Gk. *τρέω* "to tremble, quiver"
 Har. (a) *trātāra* "to shake the grain on the *afuftu-* plate to separate it from sand or to separate the finely ground flour from the unground" Lat. *terreō* "to frighten, terrify"
 IE **trem-* (**trem-*) "to tremble, shake"
 Gk. *τρέω* "to tremble, quiver"
 NHebr. *tirtēr* "to scatter, cast loose (earth)" Lat. *tremō* "to tremble, quake"
 OCS. *tręsti* "to shake"
- D. PS **t* "this" IE **to-* (**to-*) "this, that"
 Ar. *tī, tā* "this" Skt. *tād* "this, that"
 Gk. *τό* "this, that"
 Eg. *tn* "this" Goth. *pata* "that"
 Lith. *tās* "this, that"
 Toch. A *tām* "this"
 Hier. Luw. *tas* "this"

- E. PS **tāl-* "to lift, raise; hill, mound"
 Hebr. *tālā'*, *tālāh* "to hang";
tāl "mound"; *tālūl* "lofty, exalted"
 Ar. *tall* "hill, elevation";
tālī' "outstretched, long, extended; high, tall"
 Ug. *tāl* "hill, mountain"
 Akk. *tillu* "ruin"
 Eg. *tn* "to raise, elevate"
 IE **tel-* (**tel-*) "to lift, raise, weigh"
 Skt. *tuḷā* "balance, scale"; *tulayati* "to lift, weigh"
 Gk. τέλλω "to make to arise";
 τάλαντον "balance, scale";
 τλῆναι "to suffer, endure, bear"
 Lat. *tollō* "to lift up, raise, elevate"; *tolerō* "to endure, sustain"
 Goth. *þulan* "to tolerate, suffer, endure"
 Toch. A *tāl-* "to lift, raise"
- F. PS **t* "you"
 Ar. m. *'an-ta*, f. *'an-ti* "you";
 verbal suffix conjugation
 2nd sg. endings m. *-ta*,
 f. *-ti*
 Akk. m. *at-tā*, f. *at-tī*
 Hebr. m. *'at-tāh*, f. *'at-t(ī)*
 Eth. m. *'an-ta*, f. *'an-tī*
 IE **te* (**te*) "you"
 Skt. *te* (< **toi*) "you"; 2nd pl.
 verb ending *-ta* (= Gk. *-τε*)
 Gk. τοι "you"
 Lat. *tē*, *tībī* "you"
 Pal. *tī-i* "you"
 Hitt. *zi-ik* "you"
 OCS. *tī*, *tebě* "you"
- G. PS **trb* "to become dusty"
 Ar. *tarība* "to become dusty";
turba "dust, earth"
 IE **ters-* (**ters-*) "to become dry"
 Av. *taršū-* "dried up, parched, arid"
 Skt. *tr̥syati* "to thirst"; *tr̥ṣṭā-s*
 "dry, rough"
 Gk. τέρσομαι "to be or become dry"
 Lat. *torreō* "to parch, dry up";
terra "earth, ground"
 Goth. *þaurusus* "dry, withered";
þaurusjan "to thirst"
- H. Eg. *twṣw* "pustules, swellings, warts"
 IE **teu-* (**teu-*, **tewe-*) "to swell"
 Lat. *tūber* "swelling, protuberance"; *tumēō* "to swell, be swollen"
 Skt. *tavās-* "strong"
 Gk. τύλη, τύλος "knot"
 Lith. *tumėti* "to become thick";
taukai "(animal) fat"

3.18. PS $t' = IE t'$:

- A. PS $*t'rp$ "to tear, rend, pluck" IE $*t'rep-$ ($*drep-$) "to pluck"
 Hebr. $\dot{t}\bar{a}ra\varphi$ "to tear, rend, pluck"
 Aram. $\dot{t}\bar{e}ra\varphi$ "to tear, seize" Gk. $\delta\rho\acute{\epsilon}\pi\omega$ "to pluck, cull"
 OIce. $tröf$ "fringes"
 Russ. dial. $\dot{d}r\acute{a}p\acute{a}t'$, $\dot{d}r\acute{a}p\acute{a}t'$ "to scratch, scrape"
- B. PS $*mt'r$ "to rain" IE $*mat'-$ ($*mad-$) "to be wet, moist"
 Hebr. $m\dot{a}\dot{t}\bar{a}r$ "rain"
 Akk. $metru$ "rain"
 Ar. $ma\dot{t}ara$ "to rain" Gk. $\mu\alpha\delta\acute{\alpha}\omega$ "to be moist"
 Lat. $made\bar{o}$ "to be wet"
 Skt. $m\acute{a}dati$ "to be glad, rejoice, get drunk"
- C. PS $*t'll$ "to bedew; dew" IE $*t'el-$ ($*del-$) "to bedew, drip gently"
 Hebr. $\dot{t}al$ "dew"
 Ug. $\dot{t}l$ "dew"
 Ar. $\dot{t}alla$ "to bedew"
 Eth. $\dot{t}al$ "dew"; $\dot{t}alla$ "to be wet, humid" Mlr. $\dot{d}elt$ "dew"
 Arm. $te\dot{l}$ "heavy rain"
 Swed. $talg$ "tallow"

3.19. PS $d\check{z} = IE d$ ($< d\check{z}$):

- A. PS $*d\check{z}bh$ "to kill, slaughter" IE $*deb-$ ($*dhebh-$) "to harm, injure"
 Hebr. $z\bar{a}\beta a\dot{h}$ "to slaughter"
 Ar. $\dot{d}aba\dot{h}a$ "to kill, slaughter" Skt. $\dot{d}abhn\acute{o}ti$ "to hurt, injure"
 Akk. $zib\bar{u}$ "offering"
 Eg. $\dot{d}b$ "to pierce, stab"
- B. PS $*d\check{z}w-$ "to scatter" IE $*deu-$ ($*dheu-$) "to scatter, disperse, blow"
 Ar. $\dot{d}\bar{a}'a$ "to spread out, disseminate"; $\dot{d}\bar{a}da$ "to scatter, drive away" Skt. $\dot{d}h\bar{u}n\acute{o}ti$ "to shake, agitate";
 $\dot{d}h\bar{u}m\acute{a}-s$ "smoke"; $\dot{d}h\bar{u}li-s$ "dust"
 Gk. $\theta\acute{\upsilon}\omega$ "to storm, rage"; $\tau\acute{\upsilon}\varphi\omega$ "to smoke"
 Lat. $f\bar{u}mus$ "smoke"
 Lith. $\dot{d}uj\grave{a}$ "dust"; $\dot{d}\bar{u}mai$ "smoke";
 $\dot{d}\bar{u}mti$ "to blow"
 Toch. A twe , B $tweye$ "dust"

C. PS *d̥ēr- "to defecate"

Hebr. *zārā* "something loathsome"

Ar. *daraqā* "to drop excrement (bird)"; *darab* "diarrhea"

IE **der-* (**dher-*) "to defecate"

Lat. *foria* "diarrhea"

OIce. *drīta* "to defecate"; *drit* "bird excrement"

3.20. PS t̥š = IE t (< t̥š):

A. PS *t̥ml "to become drunk"

Ar. *tamila* "to become drunk"

IE **tem-* (**tem-*) "to be dizzy, stupefied, drunk"

Skt. *tāmyati* "to be faint, be exhausted"

NHG. *dämlich* "dull, silly, stupid"

Lat. *tēmulentus* "drunken, tipsy, intoxicated"; *tēmētum* "any intoxicating drink"

Russ. Ch. Sl. *tomiti* "to torture, torment, harass, tire"

B. PS *t̥šur "bull, steer"

Hebr. *šōr* "bull, ox"

Ar. *taur* "bull, steer"

Akk. *šūru* "ox"

Ug. *tr* "bull, steer"

IE **tauro-s* (**tauro-s*) "bull"

Gk. *ταῦρος* "bull, ox"

Lat. *taurus* "bull"

OIce. *þjōrr* "bull"

Lith. *taūras* "aurochs"

3.21. PS t̥š' = IE t' (< t̥š'):

A. PS *t̥š'rb "to stick, adhere, make strong"

Ar. *zariba* "to stick, adhere";
zurriba "to become hard, strong"

Akk. *šarbatu* "tree"

Eg. *drī* "hard, firm"

IE **t'eru-*, **t'reu-* (**deru-*, **dreu-*) "to bind, pledge, guarantee, make strong"

OIr. *derb* "certain"

Goth. *triggws* "true"

OE. *trēow* "truth"

Lith. *driūtas* "strong, firm"

IE **t'eru-*, **t'reu-* (**deru-*, **dreu-*) "tree, wood"

Hitt. *ta-ru* "wood"

Skt. *dāru* "wood"

Gk. *δόρυ* "tree, beam"

Goth. *triu* "tree, wood"

- B. PS **tš'ɫɫ* "to overshadow" IE **t'el-* (**deɫ-*) "to cover"
- Hebr. *šālāl* "to be or grow dark"
- Aram. *ṭēlāl* "to overshadow"
- Akk. *šalālu* "to overshadow"
- Ar. *šalla* "to shade, over-shadow"
- Ug. *ṭl* "to overshadow"
- OE. *be-teldan* "to cover"; *teld* "tent"
- OIce. *tjald* "tent"
- OHG. *zelt* "tent, vault, canopy"
- C. PS **tš'nn* "to think, believe, assume, deem, consider" IE **t'ens-* (**dens-*) "great mental power, wise decision"
- Ar. *šanna* "to think, believe, assume, deem, consider"; *šann* "opinion, belief, idea"
- Gk. *δαῦ-φρων* "wise of mind, prudent"; Hom. *δῆνεα* (< **δανσ-*) "counsels, plans"
- Skt. *dāṁsas-* "marvelous power or skill"
- Av. *dahišta-* "very wise"
- D. PS **tš'rr* "a sharp instrument used for cutting, knife; to cut" IE **t'er-* (**der-*) "to cut, split"
- Ar. *šarra* "to cut, split"; *širr* "sharp-edged stone, flint"
- Hebr. *šōr* "knife"; *šar* "flint"
- Akk. *šurtu* "knife"
- Gk. *δέρω* "to skin, flay"
- OE. *teran* "to tear"
- Skt. *dṛṇāti* "to tear, rend, split open"

3.22. PS *dz* = IE *d* (< *dž* < *dz*):

- A. PS **dzmr* "to blow, play a wind instrument, make music" IE **dem-* (**dhem-*) "to blow"
- Ar. *zamara* "to blow, play (a wind instrument)"
- Hebr. **zmr* "to make music" > *zīmṛāh* "melody, song"
- Akk. *zamāru* "to sing"
- Amh. *zāmmārā* "to sing"
- Aram. *zammārā* "flute"; *zēmār* "music"
- Skt. *dhāmati* "to blow (as wind or to blow any wind instrument)"
- OCS. *dmq* "to blow"
- Eg. *zb* "to play the flute"; *zbt* "flute"

- B. PS **dzwl* "to disappear, vanish, cease to exist" IE **deu-* (**dheu-*) "to pass away, vanish, cease to exist"
- Ar. *zāla* "to disappear, vanish, cease to exist"; *zawāl* "end, extinction"
- Hebr. *zūlāh* "removal"
- Eg. *zw* "to pass, pass on, pass away, remove"
- Goth. *daups* "dead"; *daupus* "death"
- OIce. *deyja* "to die"
- Lat. *fūnus* "funeral, burial, corpse, death"
- OIr. *dīth* "end, death"

3.23. PS *t̥s* = IE *t* (< *t̥s̥* < *t̥s*):

- A. PS **tsr̥h* "to go free, overrun, exceed" IE **ter̥h-* (**terə-*) "to overpower, overcome, surpass, cross over"
- Hebr. *sārah* "to go free, overrun, exceed"
- Ar. *saraha* "to move away, go away"; *sariha* "to proceed freely, without restraint"
- Eg. *trtr* "to overcome, destroy"
- Skt. *turāti* "to hurry"; *tūrvati* "to overpower"; *tāratī* "to cross over, overcome, surpass"; *trāyāte* "to protect, defend"
- Hitt. *tar-ah-zi* "to be powerful, be able"
- B. PS **tskk* "to join together, weave" IE **tek(s)-* (**tek[s]-*) "to join together, weave"
- Hebr. *sāxax* "to weave together"
- Ar. *sakka* "to lock, bolt (the door)"
- Skt. *tākṣati* "to fashion, create"
- Lat. *texō* "to weave"
- Hitt. *tāk-ki-(e-)eš-zi* "to join"

3.24. PS *t̥s'* = IE *t'* (< *t̥s̥'* < *t̥s'*):

- PS **t̥s'rh* "to become clear, evident" IE **t'er-* (**der-*) "to become clear, evident"
- Ar. *ṣarūha* "to become clear, evident"
- Skt. *dārpaṇa-s* "mirror"
- OHG. *zorft* "clear"
- Gk. *ὁρῶπάζειν, ὁρῶπτειν* "to see"

3.25. PS *dz* (< *g*) = IE *g*:

- A. PS **dgl-* "to glide, slip, slide" IE **glei-* (**ǵhlei-*) "to glide, slip, slide"
 Ar. *zaliqa* "to glide, slide, slip, make slippery";
zalla "to slip"; *zalaġa* "to slip, slide, glide"
 Aram. *zēlay* "to pour forth (tears), flow down"
 OE. *glīdan* "to glide, slip"
 OHG. *glītan* "to glide, slip"
- B. PS **wǵzr* "to carry" IE **weg-* (**weǵh-*) "to bear, carry, weigh"
 Ar. *wazara* "to carry"; *wīzr* "burden"
 Hebr. *wāzār* "criminal, guilty"
 PS **wǵzn* "to weigh"
 Ar. *wazana* "to weigh"; *wazn* "weight, measure"
 Ug. *mzrm* (*vwzn*) "scales, balance"
 Lat. *vehō* "to carry, convey"
 Skt. *vāhati* "to carry, transport, convey"
 OE. *wegan* "to carry, weigh"
 Lith. *vežū* "to carry, convey"
- C. PS **dār-* "to sow, scatter seed; to plant, raise, grow" IE **ger-* (**ǵher-*) "to grow"
 Hebr. *zāraʿ* "to sow, scatter seed"; *zārāh* "to scatter";
zāraq "to toss, throw, scatter abundantly"
 Ar. *zaraʿa* "to sow, spread, scatter; to plant, raise, grow"
 Akk. *zīrū* "to sow"
 Har. *zāraʿa* "to sow"
 Phoen. *zrʿ* "offspring"
 OE. *grōwan* "to grow"
 OHG. *graz* "shoot, sprig, sprout"
- D. PS **dǵrɣ* "to shine" IE **ger-* (**ǵher-*) "to shine"
 Hebr. *zerah* "dawning, shining"
 Akk. *zarāhu* "to shine"
 OIr. *grían* "sun"
 Lith. *žeriù* "to sparkle, twinkle, glitter"
- E. PS **dǵrn* "to bind, gird" IE **ger-* (**ǵher-*) "to gird, enclose"
 Ar. *zarra* "to button up"
 Hebr. *zēr* "circlet, border";
zarsīr "girded, girt"
 Eg. *drī* "to constrain, enclose, fortify; wall, fort"
 Gk. *χόρτος* "enclosed place"
 OE. *geard* "fence, enclosure"
 Lith. *gārdas* "enclosure"

- F. PS **h₂sn* "to make sad, grieve" IE **h₂ag-* (**agh-*) "to grieve, be sad"
 Ar. *ḥazana* "to make sad, sadden, grieve"
 Har. *ḥuzni* "sadness"
 Eg. *ḥḏrw* "to be overweighted, oppressed, disheartened, vexed, angry"
 Gk. *ἄχος* "pain, sorrow, grief"
 OE. *ege* "fear"
 Goth. *agis* "fright, fear, terror"

3.26. PS *t_s* (< k) = IE k:

- A. PS **t_sl-* "to lift up, weigh" IE **kel-* (**qel-*) "to lift, raise, elevate"
 Hebr. *sālā'*, *sālāh* "to weigh, balance"; *sālal* "to lift up"; *sōllāh* "mound"; *sullām* "ladder"
 Ar. *sullam* "ladder"
 Amh. *māsālal* "ladder"
 Eg. *tn* "to lift up, raise"
 Gk. *κολωνός* "hill"
 Lat. *collis* "hill"
 OE. *hyll* "hill"
 Hitt. *kalmarā* "hill"
 Lith. *kelīu* "to lift, raise"
- B. PS **t_sl-* "to twist, twine; basket" IE **kelk'-* (**qelg-*) "to twist, turn"
 Hebr. *saḥ* "basket"; *sālaḥ* "to twist, pervert"
 Ar. *sall*, *salla* "basket"
 Akk. *sallu*, *sellu*, *sillu* "basket"
 Mir. *celg* "trick, treason"
 Arm. *keḷak'* "hypocrisy"
 OE. *hyle* "bend, turn"
- C. PS **tsyr* "to move, go away, march" IE **kei-* (**qei-*) "to move, go away, march"
 Ar. *sāra* "to move, move on, move along, set out, march, travel, journey, go, go away, depart"
 Skt. *cyāvate* "to move, go away"
 Gk. *κίω* "to go"; *σεύω* "to set in swift motion, drive, chase"
 Lat. *ciēō* "to cause to move, move, stir, excite, arouse"
 OPers. *ašiyava* "set out, marched"

3.27. PS *t_s'* (< k') = IE k':

- A. PS **bwt̥s* 'to flee' IE **beukʰ-* (**bheug-*) 'to flee'
 Ar. *bāṣa* 'to flee' Gk. *φεύγω* 'to flee'
 Lat. *fugiō* 'to flee'
- B. PS **tsʰrm* 'to elapse, go by, pass, be past, be over' IE **kʰer-* (**ĝer-*) 'to come to an end, grow old'
 Ar. *ṣarama* 'to elapse, go by, pass, be past, be over' Skt. *jāṛati* 'to make old, grow old, decay'; *jarás-* 'old age'
 Eg. *ḏr* 'to bring to an end, finish'; *ḏrtyw* 'ancestors, predecessors' Arm. *cer* 'old, old man'
 Gk. *γέρων* 'old man'; *γεραιός* 'old'
 OIce. *karl* 'old man'
- C. Eg. *ḏrt* 'bread, food, sustenance'; *ḏrmyt* 'a kind of seed or grain' IE **kʰerH-* (**ĝere-*) 'grain, kernel'
 OIr. *grán* 'grain'
 Lat. *grānum* 'grain, seed'
 Lith. *žirnis* 'pea'
 Goth. *kaur̥n* 'grain'
- 3.28. PS *s* = IE *s*:
- A. PS **sm̥l* 'to be like, resemble' IE **sem-* (**sem-*) 'like, same'
 Hebr. *semeḷ* 'image, statue' Skt. *samā-s* 'equal, same'
 Gk. *ὁμός* 'same'
 Eg. *sm*, *sm̥* 'to resemble'; *smt* 'form, likeness'; *sm* 'form, image' Lat. *similis* 'like, similar'
 Goth. *sama* 'same'
- B. PS **sgl* 'to have, possess' IE **seǵ-* (**seǵh-*) 'to have, hold'
 Hebr. *seṽullāh* 'possession, property' Gk. *ἔχω* 'to have, hold'
 Skt. *sāhate* 'to overcome, conquer'
 Akk. *sugullāte* 'herds' Goth. *sigis* 'victory'
 Eg. *sḏwt* 'treasure'
- C. PS **sld* 'to spring, leap' IE **sel-* (**sel-*) 'to spring, leap'
 Hebr. *sālāḏ* 'to spring, leap' Lat. *salīō* 'to spring, leap, jump'
 Gk. *ἄλλομαι* 'to spring, bound, leap'

- D. PS **skn* "to cut, carve; knife" IE **sek-* (**seq-*) "to cut"
- Hebr. *sakkīn* "knife, blade"
 Ar. *sikkīn* "knife"
 Ug. *skn* "to form, fashion, shape; monument, statue"
 Lat. *secō* "to cut, wound, hurt"
 OE. *seax* "knife"
 Welsh *hesg* "sedges"
 OCS. *sečk* "to chop"
- Eg. *skr* "to cut, smite"; *skn* "to cleave, split"
- E. Eg. *sw*, *swr*, *swrī*, *swī* "to drink"; Copt. *sō* "to drink" IE **seu-* (**seu-*, **sewe-*, **sū-*) "to drink"
- Lat. *sūgō* "to suck"
 OIce. *sūpa* "to sip, drink"
 OE. *sēaw* "juice, liquid"
- Berb. *su* "to drink"
 Sid. *sō* "to drink"
- IE **swel-* (**swel-*) "to drink, swallow"
- OE. *swelgan* "to swallow"
 OIce. *swelga* "to swallow"
- 3.29. PS *š* = IE *s* (< *š*):
- A. PS **š?*- "to be at rest, quiet" IE **se?*- (**sē-*) "to be at rest, quiet"
- Hebr. *šā'an* "to be at ease or at peace, rest securely"
 Ar. *sa'ima* "to be weary, tired"
 Ug. *šīn* "present, gift" < **ap-peasement*"
 Gk. *ἡσυχος, ἡσύχλος* "quiet, still, at rest, at ease"
 Skt. *sāyā-m* "evening"
 Lat. *seerus* "late, tardy"
- B. PS **šlm* "to be safe and sound" IE **sol-* (**sol-*) "whole, safe, uninjured"
- Hebr. *šālēm* "to be complete, sound"
 Ar. *salīma* "to be safe and sound"
 Akk. *šālāmu* "to be safe, unharmed"
 Ug. *šlm* "to be safe and sound"
- Lat. *salvus* "safe, unhurt, well, sound"
 Skt. *sārva-s* "all, whole, entire"
 Gk. *ὅλος* "whole, entire, complete"
 Toch. A *salu* "completely, entirely"
- (Eg. *snb* [**šnb* ?] "to be sound, healthy")

- C. PS *šr- "to creep, crawl, flow" IE *ser- (*ser-, *serp-, *sreu-)
 "to creep, crawl, flow"
 Hebr. šāraš "to swarm, teem"
 Ar. sarība "to flow, creep";
 sirb "herd, flock, swarm";
 sarība "reptile"
 Syr. šeraš "to creep, crawl"
 Skt. śārati "to run, flow, move";
 śārpātī "to creep, crawl";
 śrāvati "to flow"
 Lat. serpō "to creep, crawl";
 serpēns "snake, serpent"
 Gk. ἔρπω "to creep, crawl"; ῥέω
 "to flow"
 Lith. sraviū "to flow"
- D. PS *šll "to take away, remove" IE *sel- (*sel-) "to take, seize"
 Hebr. šālāl "to spoil, plunder" Gk. ἐλεῖν "to take, seize"
 Ar. salla "to pull out, with-
 draw, remove gently" OIr. sellaim "to take"
 Akk. šalālu "to spoil, plunder" OIce. selja "to give up, sell"
 PS *šlp "to draw out, pluck
 out"
 Hebr. šālaḡ "to draw out, off"
 Akk. šalāpu "to pluck out,
 draw"
 PS *šlb "to take away, rob"
 Ar. salaba "to take away, rob,
 steal, plunder"
 Eg. šrš "to plunder, carry off"
- E. PS *nšp "to breathe, blow" IE *nas- (*nas-) "nose"
 Hebr. nāšāḡ "to blow"
 Ar. nasaḡa "to scatter, blow"
 Akk. našāpu "to blow, blow
 away"
 Eg. nšp "to breathe, inhale"
 Skt. naśā "nose"
 OE. nosu "nose"
 Lith. nosis "nose"
 Lat. nāris "nostril"
- F. Eg. šm, šmm "to be hot"; šm,
 šmw "summer" IE *sem- (*sem-) "summer"
 OIr. sam "summer"
 OE. sumor "summer"
 Skt. śmā "season, year, summer"

- G. PS *šenn "to grow old, age" IE *sen- (*sen-) "old"
- Ar. *sanna* "to grow old, age, be advanced in years";
'asann "older, farther advanced in years";
musinn "old, aged" Lat. *senex* "old, aged"
OIr. *sen* "old"
Goth. *sineigs* "old"
Lith. *sėnas* "old"
Skt. *sāna-s* "old, ancient"
- Akk. *šanānu* "to have reached, attained"; *šinnatu* "attainment, achievement, equality"

3.30. PS 4 = IE k (< kx < k4 < t4):

- A. PS *4ts'ts' (< *4k'k') "fish-hook" IE *kek'- (*qeg-) "hook"
- Ar. *šišṣ* "fishhook" OE. *hōc* "hook"; *haca* "bolt"
- Russ. *kógot'* "claw"
- B. PS *4r- "to be high, tall, lofty" IE *ker- (*ķer-) "top, summit, head"
- Ar. *šarufa* "to be high, tall, lofty"; *šaraf* "elevated place"
- Skt. *śiras-* "head"
- Gk. *káρā* "head"; *κορυφή* "summit"
- Arm. *sar* "height, point, peak"
- Hebr. *śar* "chieftan, ruler"
- OIce. *hjárn* "brain"
- Akk. *šarru* "king" Lat. *cerebrum* "brain"
- C. PS *4y- "to turn gray; gray hair" IE *kei- (*ķei-) "gray-haired, old"
- Akk. *šēbu* "old man"
- OE. *hār* "gray, hoary, old"
- Hebr. *śēḇ* "old age"; *śēḇāh* "gray hair, old age"
- Skt. *śi-tī-s* "white"
- OCS. *śěrv* "gray"
- Ar. *šāba* "to turn white or gray (hair)"; *šaiḇ* "gray hair"; *šāḥa* "to age"
- Eth. *šeba* "to have gray hair"
- Ug. *šb* "old man"; *šbt* "gray hair"
- D. PS *4mł "to enclose, contain, wrap" IE *kem- (*qem-) "to enclose"
- Ofris. *hemme* "enclosed land"
- Hebr. *śimlāh* "wrapper, mantle"
- OIce. *hemja* "to restrain, hold back"
- Ar. *šamila* "to contain, wrap, enclose"; *šamla* "cloak, turban"
- Lith. *kamlioti* "to torment, torture"

- IE **kem-* (**k̑em-*) "to cover, cloak, wrap up"
- Skt. *śāmūla-s* "woolen shirt"
 Lat. *camisia* "linen shirt or night-gown"
 OE. *hama* "dress, covering"; *hemeþ* "shirt"
- E. PS **ṁkl* "to hook up; peg, hook"
- IE **kenk-* (**k̑enq-*) "to hook up, hang"
- Ar. *šankala* "to hook up";
šankal "peg, hook"
- Skt. *śaṅkú-s* "peg, nail, spike"
 Hitt. *ga-an-ki* "to hang"
 OIce. *hanga* "to hang"
- PS **ṁk'* "to hang"
- IE **kenk'-* (**qeng-*) "to hook up, hang"
- Ar. *šanaqa* "to hang"
- NPers. *šang* "claw, fist"
 OHG. *hank* "handle"
 Lith. *kėngė* "hook, clasp, latch"
- F. PS **ṁr* "hair; hairy"
- IE **keyr-* (**k̑ēr-*) "hair"
- Hebr. *śē'ār* "hair"
 Ar. *ša'rānī* "hairy"
 Akk. *šārtu* "hairy skin"
 Ug. *š'rt* "wool"
- OE. *hār*, *hēr* "hair"
 OHG. *hār* "hair"
- G. PS **ṁr* "to become a youth, mature"
- IE **ker-* (**k̑er-*) "to grow, mature"
- Ar. *šaraḥa* "to become a youth, mature"
- Arm. *ser* "descent, origin"
 Gk. *κόρος* "boy, son"
 Lat. *creō* "to make, create, produce"; *cresecō* "to spring forth, grow"
 OHG. *hirso* "millet"
- Eg. *šrr* "boy, youth, young man"; *šrl* "boy, son"
 Hausa *saurayī* "young man"
- H. PS **ṁr* "to harm, injure"
- IE **ker-* (**k̑er-*) "to harm, injure, destroy"
- Ar. *šarra* "to be vicious, bad, malicious"; *šarr* "injury, evil, harm"
- Skt. *śṛṇāti* "to crush, rend, break"
 Gk. *κῆρ* "death, destruction"; *καταύζω* "to destroy, kill, plunder"
 Alb. *ther* "to kill, slay"
 Toch. A *kāryap* "injury, harm"
- Eg. *šrsk* "to destroy"

- I. PS **ṣr̥p* "to burn" IE **ker-* (**qer-*) "to burn"
 Hebr. *śāraḡ* "to burn"
 Akk. *šarāpu* "to burn"
 Ug. *šrp* "to burn"
 (Eg. *srf* [< **šrf* ?] "to be hot; heat, flame, fire")
 OE. *heorð* "hearth"
 Lith. *kārštas* "hot"
 Lat. *carbō* "burning or burnt wood"
 OIce. *hyrr* "fire"
- J. PS **ṣrt'* "to impose as a condition, make a contract, agreement" IE **kret'-* (**ḱred-*) "agreement, contract"
 Ar. *šaraṭa* "to impose as a condition, make a contract; to bet, wager"; *šarṭīya* "agreement, contract"; *šarṭ* "condition, clause, proviso, provision"
 Skt. *śrat-karoti* "to make secure, guarantee"; *śrad-dadhāti* "to believe, be trustful"
 Lat. *crēdō* "to trust, entrust"
 OIr. *cretim* "to believe"
- K. PS **ṣrt'* "to incise, scratch" IE **kert'-* (**qerd-*) "to incise, scratch, cut, carve"
 Hebr. *śāraṭ* "to incise, scratch"
 Ar. *šaraṭa* "to make incisions, scratch"
 Akk. *šarāṭu* "to slit up, rend"
 Gk. *κέρδος* "profit, advantage, gain"
 OIr. *cerd* "art, craft"
 Lat. *cerdō* "workman, artisan"

3.31. PS **ṣ'* = IE *k'* (< *kx'* < *kṣ'* < *tṣ'*):

- PS **ṣ'md* "to join together, yoke, harness" IE **k'em-* (**ḡem-*) "to be joined"
 Ar. *ḍamada* "to dress, bandage"
 Hebr. *šemeḏ* "couple, pair"
 Akk. *šamādu* "to yoke, harness"
 Ug. *šmd* "team, yoke; to harness"
 Eth. *ḍamada* "to yoke oxen"
 Skt. *jāmī-s* "related"
 Gk. *γαμέω* "to marry"
 NPers. *dāmād* "son-in-law" (= Skt. *jāmātar-*; Av. *zāmātar-*; Gk. *γαμβρός*; Lat. *gener* [< **gem-*]; Alb. *dhëndërr*, *dhândërr*; Lith. *žentas*; OCS. *zeto*)
 Eg. *ḏmm* "to unite with"; *ḏm?* "to bind, tie together"; *ḏm?* "to join, bring together"; *ḏmd* "to unite with, add to"

3.32. PS g = IE g:

- A. PS **mgd* "to be great, mighty, exalted, glorious"
 Hebr. *meveð* "excellence"
 Ar. *mağada* "to be glorious, illustrious, exalted"
 IE **meg-* (**meǵh-*, **moǵh-*) "to be great, mighty"
 Goth. *mahts* "might, power"
 OE. *magan* "to be able"
 Skt. *mahānt-* "great, large, powerful, venerable"; *mahāyati* "to honor, revere, esteem highly, magnify, exalt"
 OCS. *mogq* "to be able"
- B. PS **gb-* "highest point, top"
 Hebr. *gaß* "brow"; *gāḇah* "to be high, exalted"; *gəḇāl* "mountainous region"; *giḇ'āh* "hill, height, elevation"
 Akk. *gab'u* "summit, top"
 Ar. *ğabīn*, *ğabha* "forehead, brow"; *ğabal* "mountain"
 Ug. *gb'* "hill"; *gbl* "mountain"
 IE **geb-* (**ghebh-el-*) "gable, head"
 Gk. *κεφαλή* "head, front end, point"
 Goth. *gibla* "gable, pinnacle"
 Toch. A *śpāl-* "head"
- C. PS **grb* "to scratch, itch"
 Hebr. *gārāḇ* "itch, scab"
 Akk. *garabu* "itch"
 Ar. *ğarab* "itch, scabies"
 PS **grd* "to scratch, scrape, peel"
 Hebr. *gāraḏ* "to scratch, scrape"
 Ar. *ğarada* "to peel, pair"
 IE **ger-* (**ǵher-*) "to scratch scrape"
 Lith. *žeriù* "to rake"
 Gk. *χαράσσω* "to cut, engrave, scratch"
 IE **greb-* (**ghrebh-*) "to scratch, scrape"
 Goth. *graban* "to dig"
 SCr. *grèbšti* "to scratch"
 IE **grem-* (**ghrem-*) "to scrape"
 Goth. *gramsta* "splinter"
 Lith. *grémžiù* "to scrape"
- D. PS **grʔ* "to crush, grate"
 Ar. *ğaraša* "to crush, grate, grind"; *ğarīš* "crushed grain, grits"
 Hebr. *gereś* "groats, grits"
 IE **ger-* (**gher-*) "to crush"
 Gk. *κέγχρος* "millet"; *μάχρος* "parched barley"
 Lith. *gùrti* "to crumble"

- PS **grn* "threshing floor"
 IE **gersd-* (**ǵherzdḥ-*) "barley"
 Hebr. *gōren* "threshing floor"
 Gk. *κῆ* "barley"
 Ar. *ǧarn* "threshing floor"
 Lat. *hordeum* "barley"
 OHG. *gersta* "barley"
 PS **grs* "to be crushed"
 IE **grent'-* (**ǵhrend-*) "to grind"
 Hebr. *gāras* "to be crushed"
 Gk. *χόνδρος* (< **χρονδ-ρος*) "grain"
 Lat. *freñdō* "to crush, bruise, grind"
 IE **grend-* (**ǵhrendḥ-*) "to grind"
 OE. *grindan* "to grind"
 Lith. *grėndu* "to rub"; *grándyti* "to scrape"
 E. PS **gdd* "to gather together"
 IE **ged-* (**ǵhedḥ-*) "to gather together, collect"
 Hebr. *gāḏaḏ* "to gather in bands or troops"
 Skt. *gádhya-s* "seized"
 OFris. *gadia* "to unite"
 OE. *gadrian* "to gather together, collect"
 OCS. *godv* "time"
 F. PS **grp* "to seize, grasp"
 IE **ger-* (**ǵher-*) "to seize, grasp"
 Hebr. *'eyrḏq* "fist"
 Skt. *hāratī* "to take"
 Gk. *χείρ* "hand"
 Arm. *jeṛn* "hand"
 G. PS **gšš* "to touch, feel, handle"
 IE **ges-* (**ǵhesor-*; **ǵhesto-s*) "to handle; hand"
 Hebr. *gāššaš* "to feel with the hand"
 Hitt. *ki-eš-šar* "hand"
 Skt. *hāsta-s* "hand"
 Ar. *ǧassa* "to touch, feel, handle"
 Lat. *praestō* (< **prae-hestōd*) "at hand"

3.33. PS *k* = IE *k*:

- A. PS **kpp* "palm, hand"
 IE **kap-* (**qap-*) "to seize"
 Hebr. *kaq* "palm"
 Lat. *capiō* "to take, seize"
 Akk. *kappu* "hand"
 OHG. *haft* "captivity"

Ar. *kaff*, *kiffa*, *kaffa* "palm
of the hand"

Ug. *kp* "hand"

Eth. *kappu* "palm of the hand"

Eg. *kp* "to seize"

B. PS **ʔkl* "to eat"

IE **ʔek-* (**ek̑-*) "to eat"

Hebr. *ʾāxal* "to eat"

Skt. *ásnāti* "to eat"

Ar. *ʾakala* "to eat"

Akk. *akālu* "to eat"

Ug. *āk̑l* "to eat"

Eth. *ʾekəl* "food"

C. PS **k-* "as, like; that, for,
when"

IE **kai* (**qai*) "when, as, though"

Hebr. *kə-* "as, like, as if";
kī "that, for, when"

Gk. *καί* "and, also, even though"

Ar. *ka* "as, like"; *kai* "so
that"

Lith. *kaĩ* "when, as"

Ug. *k* "as, like"

Akk. *kī* "that, for, when"

Eg. *kī* "so, then"

D. PS **k̑m* "to cut"

IE **kes-* (**k̑es-*) "to cut"

Hebr. *kāsam* "to shear, clip"

Skt. *śasati* "to cut down, kill,
slaughter"

Ug. *k̑m* "to cut"

Akk. *kasāmu* "to cut in pieces"

Lat. *castrō* "to castrate"

PS **k̑h̑* "to cut off, away"

Gk. *κεάρω* "to split, cleave"

Hebr. *kāsaḥ* "to cut off, away"

Ar. *kasaha* "to sweep, clean"

< "to cut off, remove,
do away with"

PS **k̑s* "to cut into pieces,
cut up, divide"

Hebr. *kāsas* "to compute"

Akk. *kissatu* "fodder"

- E. PS **k₁l_h* "to call someone by shouting"
 Eth. *kalḥa* "to call someone by shouting"
 IE **kel-* (**qel-*) "to call, cry out"
 Gk. *καλέω* "to call, summon"
 Lat. *calō* "to call, summon"
 OHG. *halōn* "to call, fetch"
- F. PS **k₁rt* "to cut off, cut down"
 Hebr. *kāraθ* "to cut off, cut down"
 Akk. *karātu* "to hew off"
 IE **ker-* (**[s]qer-*) "to cut off"
 Skt. *kartati* "to cut, cut off"
 Hitt. *kar-aš-zi* "to cut off"
 Gk. *κείρω* "to cut off, clip, hew down"
 Toch. A *kārət-* "to cut up, destroy"
- G. PS **k₁l?* "to guard, watch, hold"
 Hebr. *kālā'* "to shut up, restrain, withhold"
 Ar. *kala'a* "to guard, watch, protect, preserve"
 Akk. *kālu* "to hold"
 Eth. *kal'a* "to prevent, forbid"
 IE **kel-* (**qel-*) "to guard, watch, hold"
 Goth. *haldan* "to hold, take care of, tend"
 OE. *healdan* "to hold"
- H. PS **k₁lm* "to injure"
 Hebr. *kālam* "to be humiliated"
 Ar. *kalm* "wound, cut, slash"
 IE **kel-* (**qel-*) "to injure, strike, slay"
 Lat. *calamitās* "loss, misfortune, damage, calamity"; *clādēs* "disaster, injury"
 Lith. *kalū* "to forge, strike"
- I. PS **k₁w-* "to heap, pile up"
 Ar. *kāma* "to heap, stack up, pile up, accumulate";
kawm "heap, pile; hill";
kāda "to heap up, pile";
kauḍa "heap, pile"
 Hebr. *kūmāz* "name of a golden ornament (depicting female breasts or pudenda)"
 IE **keu-* (**qeu-*) "to heap, stack up, pile up, accumulate"
 Goth. *huhjan* "to heap up"; *hiuḥma* "heap, multitude"; *hauhs* "high"
 OIce. *haugr* "grave-mound"
 OHG. *houc* "hill"
 Lith. *kaūkas* "swelling, boil"; *kaukarà* "hill"
 Toch. A *koc* "high"
 Skt. *kakūbh-*, *kakūd-* "summit, peak"
 Lat. *cacūmen* "top, tip, summit, zenith"

- J. PS **krd̥s* "to heap up, crowd together"
 Ar. *kardasa* "to heap up, pile up, crowd together";
takardasa "to be heaped up, piled up; to flock together, crowd together"
- IE **kor-* (**qor-*) "crowd, multitude"
 OIce. *herr* "host, people, army"
 Goth. *harjis* "army, host"
 Mir. *cuire* "troop, crowd, band"
 Lith. *kāriās* "army"; *kāras* "war, warfare"
 IE **kerdo-* (**kērdho-s*) "herd, flock, troop"
 Skt. *śārdha-s* "host, troop, multitude"
 Goth. *hairda* "herd, flock"
 Lith. *keṛdžius* "herdsman"
 OIr. *croð* "troop"
 Welsh *cordd* "tribe, family"
- 3.34. PS *k'* = IE *k'*:
- A. PS **h̥k'ɫ* "field"
 Ar. *ḥaql* "field"
 Aram. *ḥaqlā* "field"
 Akk. *eq̄lu* "field"
- IE **h̥hak'-ro-* (**aḡ-ro-s*) "field"
 Skt. *ājra-s* "field, plain"
 Gk. ἀγρός "field"
 Lat. *ager* "field"
 Goth. *akrs* "field"
- B. PS **k'ny* "to get, acquire"
 Hebr. *qānāh* "to get, acquire"
 Ug. *qny* "to create, produce, bring forth"
 Ar. *qanā* "to get, acquire"
 Akk. *qanū* "to gain, acquire"
- IE **k'en-* (**ḡen-*, **ḡenə-*) "to beget"
 Skt. *jānati* "to beget"
 Gk. γίγνομαι "to be born"; γεννάω "to beget, bear"
 Lat. *genō*, *gignō* "to beget, bear, bring forth"
- Eg. *qn*, *qn̄* "to be strong, make strong, have power over, possess, overcome"
- C. PS **h̥k'-* "to cut into"
 Hebr. *ḥāqaq* "to cut in or on, engrave, inscribe"; *ḥāqāh* "to cut into, carve"
- IE **h̥hak'-* (**agwesī*, **agusī*) "to cut into, hew; axe"
 Gk. ἀξίον "axe"
 Goth. *aqizi* "axe"
 OE. *æx* "axe"

- D. PS **ḥk'k'* "to decree, command" IE **ḥhak'*- (**aḡ*-) "to direct, command"
 Hebr. *ḥāqqaq* "to decree, ordain laws"
 Ar. *ḥaqqā* "to put into aciton, enforce"
 Eth. *ḥəgg* "law"
 Eg. *ḥq, ḥq?* "to rule, govern, direct, guide, reign"
 Gk. *ἄγω* "to lead, conduct, guide, rule, direct, command, instruct"
 Skt. *ájati* "to drive"
 Lat. *agō* "to drive"
 Arm. *acem* "to bring, lead"
 Toch. A *āk*- "to lead, conduct"
- E. PS **k'r?* "to call, proclaim" IE **k'er*- (**ger*-) "to cry hoarsely"
 Hebr. *qārā* "to call, proclaim"
 Ar. *qara'a* "to recite, read"
 Ug. *qrā* "to call"
 Akk. *qerū* "to call to, invite"
 OE. *ceorian* "to murmur, grumble";
ceorran "to creak"
 Berb. *ger* "to cry out, call"
 Bilin *qar* "to read, learn"
- F. PS **k'wš* "to be bent, curved" IE **k'eu*- (**geu*-) "to be bent, curved"
 Ar. *qawisa* "to be bent, curved";
qaus "bow"
 Hebr. *qešēθ* "bow"
 Akk. *qaštu* "bow"
 Ug. *qšt* "bow"
 Eth. *qast* "arc"
 Gk. *γῦρός* "round, curved"
 NHG. *Kugel* "globe, sphere"
 OIce. *kūfōttr* "convex"
 Lith. *gugà* "bump, growth"
- G. PS **k'yʔ* "to crack, burst, break, burst open" IE **k'ei*- (**ḡei*-) "to crack, break, burst open"
 Ar. *qāḍa* "to break, crack, split, cleave, burst open"
 OE. *cīnan* "to crack"
 Lett. *ziēdu* "to bloom"
 Goth. *keinan* "to bud, grow, spring up"
- H. PS **k'm*- "to seize, grasp, press together" IE **k'em*- (**gem*-) "to seize, grasp, press together"
 Hebr. *qāmaṭ* "to seize, press together"; *qāmaš* "to grasp"
 Gk. *γέμω* "to be full"
 Lett. *gūnstu* "to seize, grasp"
 OE. *cimb, cimbe* "joint"
 OCS. *žemq* "to press"

- I. Eg. *qm̃t* "to lament, moan, groan"; *qmd̃*, *qmd̃* "to weep, wail, lament"

IE **k'em-* (**gem-*) "to moan, groan, lament"

Lat. *gemō* "to sigh, groan, lament, bemoan"

3.35. PS *g* (< *g^w*) = IE *g^w*:

- A. PS **gny* "to harm"

IE **g^wen-* (**g^when-*) "to strike, slay, kill, wound, hurt"

Ar. *ḡanā* "to commit a crime, harm, inflict"; *ḡināya* "perpetration of a crime, felony"

Hitt. *ku-en-zi* "to stike, kill"
Skt. *hānti* "to smite, slay, hurt, kill, wound"

Gk. *θαίνω* "to strike, wound"

OIr. *gonim* "to wound, slay"

- B. Eg. *gn.t* "heap, abundance"

IE **g^wen-* (**g^when-*) "to swell, abound"

Skt. *ā-hanā-* "swelling, distended"

Arm. *yogn* (< *i* + **o-g^won-* or **o-g^wno-*) "much"

Gk. *εὐθηνέω* "to thrive, prosper, flourish, abound"

Lith. *ganà* "enough"

3.36. PS *k* (< *k^w*) = IE *k^w*:

- A. PS **kyl* "to repay"

IE **k^wei-* (**q^wei-*) "to repay"

Ar. *kāla* "to return like for like, repay in kind"

Gk. *τίνω* "to requite, atone for, repay"; *ποινή* "retribution, penalty"

Av. *kaēnā-* "punishment, revenge";
čikayaṭ "to atone for"

- B. PS **kīb* "dog"

IE **k^wel-* (**q^wel-*) "dog"

Hebr. *keleḅ* "dog"

OHG. *hwelf* "whelp, puppy"

Ar. *kalb* "dog"

Lith. *kālė* "female dog, bitch"

Akk. *kalbu* "dog"

Ug. *kīb* "dog"

- C. PS **kyp* "to form, shape, mold, fashion, fit" IE **k^wei-* (**q^wei-*) "to form, fashion, fit"
- Ar. *kāfa* "to form, mold, fit, shape, fashion, adjust, adapt" Skt. *cinōti*, *cāyati* "to arrange in order, heap up, construct, gather, collect"
- Gk. *ποιέω* "to construct, make"
- OCS. *činiti* "to arrange"
- D. PS **k^wy* "to dig" IE **k^wer-* (**q^wer-*) "to plow; field, furrow"
- Hebr. *kārāh* "to dig (a well)" Hitt. *ku-e-ra-aš*, *ku-ra-aš* "field, plain"
- Ar. *karā* "to dig" Lyd. *qīra-* "property, belongings"
- Eth. *karaya* "to dig a hole" Skt. *kārṣati*, *kṛṣāti* "to plow"; *karṣū-s* "furrow"
- Av. *karša-* "furrow"; *karšū-* "field"
- E. PS **kry* "to buy, rent" IE **k^wrei-* (**q^wrei-*) "to buy"
- Hebr. *kārāh* "to buy, purchase" Skt. *krīṇāti* "to buy, purchase"
- Ar. *kariya* "to rent, hire" Gk. *πολάμω* "to buy, rent"
- OIr. *crenaim* "to buy"
- ORuss. *kronuti*, *krenuti* "to buy"
- Toch. A *kuryar* "commerce"
- 3.37. PS *k' (< k^w) = IE k^w:*
- A. PS **k^wrtš'* "to praise" IE **k^wer-* (**g^wer[ə]-*) "to praise"
- Ar. *qaraza* "to praise, commend, laud, extol, acclaim" Skt. *grṇāti* "to praise, extol"
- Lith. *giriū* "to praise, commend"
- Lat. *grātus* "pleasing, welcome, agreeable"; *grātēs* "thanks"
- OHG. *queran* "to sigh"
- B. PS **k^wy^h* "to fester, be purulent" IE **k^wei-* (**g^wei-*) "to be foul, putrid"
- Ar. *qāha* "to fester, be purulent" Gk. *δεῖσα* "slime, filth"
- OIce. *kveisa* "boil, whitlow"
- OCS. *židvko* "succosus"

PS **k'y*? "to vomit"

Hebr. *qā'* "to vomit up"

Ar. *qā'a* "to vomit"

Akk. *qā'u* "to spit"

Eg. *q3, q33* "to be putrid,
foul; to vomit; corrup-
tion"; *q3'* "to vomit";
q3'w "vomit"

C. Eg. *qm* "to bring to an end,
complete"

IE **k^wem-* (**g^wem-*) "to come,
go" < "to approach toward
or arrive at a goal"

Gk. βαῖνω "to go, walk"

Skt. *gāmati* "to go, move, set
out, come, approach, go
to or towards"

Lat. *veniō* "to come"

Goth. *qiman* "to come"

Toch. A *kām-* "to come"

3.38. PS $x (< x^D < h) = IE \text{ } \underline{h}h (< h)$:

A. PS **xrk'* "to tear, rend, break
apart"

IE **h^hork'-* (**org-*) "to tear,
rend, break apart"

Ar. *haraqa* "to tear, rend,
break apart"

Hitt. *har-ak-zi* "to be destroyed"

Hebr. *hāraq* "to grate"

Arm. *harkanem* "to split, fell"

OIr. *orgaim* "to slay"

B. PS **xrts'* (< **h^hrk'*) "to be
yellow; gold"

IE **h^hark'-* (**arĝ-*) "to glisten"

Hebr. *hārūs* "gold"

Skt. *ārjuna-s* "white, light"

Akk. *hurāšu* "gold"

Gk. ἀργός "glistening, white"

Ug. *hrs* "gold"

Hitt. *har-ki-iš* "white"

Ar. *hurs*, *hirs* "earring"

Lat. *argentum* "silver"

Arm. *arcat* "silver"

Toch. A *ārki* "white"

C. Eg. *hnt* "face, front part; in
front of"; *hntw* (adv.)
"before"

IE **h^hant-s* (**ant-s*) "front";
h^hanti* (anti*) "in front of,
before"

Skt. *ānti* "before"

Hitt. *ha-an-za* "front"; *ha-an-ti*
"in front of, before"

Gk. ἀντί "opposite"
 Lat. *ante* "before"

- D. Eg. *ḥpī* "to go, travel, march, sail (of a boat), fly away (of birds), flow (of water)"; *ḥpī* "flowing"
 IE **h₁hap-* (**ap-*) "to flow"
 Hitt. *ḥa-pa-a* "river, stream"
 Pal. *ḥa-a-ap-na-aš* "river, stream"
 Skt. *āpas-* "water"
 Lat. *amnis* (< **ab-nis*) "river, stream"
 OPruss. *ape* "river, stream"
 Toch. B *āp* "water, river, stream"

3.39. PS ʕ = IE ʕ (< ʕ):

- A. PS **ʕgl* "young of an animal"
 Ar. *ʕġl* "calf"
 Hebr. *ʕeġel* "calf"
 Akk. *agalū* "calf"
 Ug. *ʕl* "calf"
 Eth. *ʕəġəl* "young of animals"
 Amh. *gəlgəl* "young of domestic animals; cub, kid"
 IE **ʕhag-* (**aġh-*) "with young (of an animal)"
 Skt. *ahī* "cow"
 Av. *azī* "with young (of cows or mares)"
 Mir. *ag* "ox, cow"; *āl* (< **aglo-*) "litter, brood"
- Eg. *ʕ-*, *gn-* prefix placed before several words dealing with cattle
- B. PS **ʕtkʔ* "to move, proceed, advance"
 Hebr. *ʕθēq* "to move, proceed, advance (in years)"
 Akk. *etēqu* "to pass through"
 Ar. *ʕtuqa* "to grow old, age, mature"
 Ug. *ʕtq* "to proceed, pass through"
 IE **ʕhat-* (**at-*) "to move, proceed, advance (in years)"
 Skt. *ātati* "to go, walk, run"
 Lat. *annus* (< **atnos*) "year"
 Goth. dat. pl. *apnam* "year"
- C. Eg. *ʕm* "to grasp; fist"
 IE **ʕham-* (**am-*) "to grasp"
 Skt. *āmātra-m* "drinking vessel"
 Lat. *ampla* "handle"
 Arm. *aman* "vessel, container"

- D. PS * $\text{ʕ}l\omega$ "to be high, elevated; to rise high; to exceed, surpass; to grow" IE * $\text{ʕ}al-$ (* $al-$) "to be high; to grow"
- Ar. 'alā "to be high, elevated, rise high; to exceed, surpass"
- Hebr. 'ālāh "to go up, ascend, climb; to spring up, grow"
- Akk. elū "to go up"
- Ug. 'ly "to ascend, climb up"
- Eth. 'alawa "to exceed"
- Lat. alō "to nourish, support"; altus "grown, great, high"
- OIr. alim "to rear"
- Goth. alan "to grow"; alds "age, life"
- Eg. 'r "to ascend"; 'r'r "to rise up, go up, ascend"
- E. Eg. 'wn "to sleep, slumber" IE * $\text{ʕ}au-$ (* $au-$) "to sleep"
- Gk. ἰαύω "to sleep, pass the night"; aor. ἄεσα "to sleep"
- Arm. aganim "to spend the night"
- Skt. vāyati "to become tired, weary"
- F. Eg. 'n "to turn, return, repeat"; 'n "again, on the contrary"; 'nn "to return, turn back"; 'n'n "to turn back, contradict" IE * $\text{ʕ}an-$ (* $an-$) "on the other hand"
- Skt. anyā-s "other, different"; āntara-s "different"
- Goth. anþar "other"
- Lith. antras "second"
- G. Eg. 'wt "sheep and goats, animals, flocks" IE * $\text{ʕ}owi-$ (* $owi-s$) "sheep"
- Skt. āvi-s "sheep"
- Lat. ovis "sheep"
- Gk. ὄϊς , οἶς "sheep"
- Arm. hov-iw "shepherd"
- OIr. oí "sheep"
- OE. ēow "sheep"
- Lith. avīs "sheep"
- Luw. ḫa-a-ú-i-iš "sheep"
- H. PS * ʕwp "to fly; bird" IE * $\text{ʕ}awi-$ (* $awi-s$) "bird"
- Ar. 'āfa "to fly about"
- Hebr. 'ūḡ "to fly"; 'ōḡ "fowl, birds"
- Ug. 'p "to fly"
- Eth. 'ōf "bird"
- Skt. vī-s "bird"
- Arm. hav "bird"
- Lat. avis "bird"

Eg. 'pī "to fly"

I. PS *ʕt'- "to smell"

IE *ʕhot'- (*od-) "to smell"

Ar. 'aṭira "to perfume, scent";
'aṭir "sweet-smelling,
fragrant"; 'aṭina "to
rot, decay, putrefy";
'aṭin "putrid, rotten,
stinking"

Arm. hot "smell, odor"
Gk. ὀζω "to smell"
Lat. odor "smell, odor"
Lith. uodžiu "to smell"

3.40. PS ḥ = IE ḥh (< ḥ):

A. PS *ḥng "to be narrow, con-
stricted; throat, larynx"

IE *ḥhang- (*anġh-) "to be narrow;
to choke, strangle"

Ar. ḥanġara "larynx, throat"

Skt. anḥu-s "narrow"

Eg. ḥng "to be narrow, con-
stricted"; ḥngg "throat,
gullet"

Gk. ἄγχω "to strangle"

Lat. angō "to strangle, throttle"

Goth. aggwis "narrow"

Berb. anḡa "palate"

B. PS *ḥlm "to be healthy, strong"

IE *ḥhal- (*al-) "to be healthy"

Hebr. ḥālam "to be healthy,
strong"

Gk. ἀλθεῖν, ἀλθαίνειν "to become
whole, sound"; ἀλθαίνω "to
heal"

C. Eg. ḥsḥs "to be hot, burn;
fire, flame"; ḥss "heat,
flame, fire"

IE *ḥhas- (*ās-) "to burn, glow,
be hot"

Hitt. acc. ḥa-aš-ša-an "hearth"

Lat. āra "altar"

Skt. āsa-s "ashes, dust"

Gk. ἄτω "to be dry"

OIce. aska "ashes"

D. Eg. ḥr "for, because, with,
and, therefore, more-
over"; ḥr' "with, and"

IE *ḥhar- (*ar, *r) "then, there-
fore, and"

Gk. ἄρα, ἄρ, ῥα "then, therefore"

Lith. ar̃ "whether, if"; ir̃ "and,
and then, and so"

- E. Eg. *ḥwr* "a mass of water";
ḥw? "moisture, water;
damp"
- IE **h₂wer-* (**wer-*) "water"
- Hitt. 3 pl. *ḥur-na-an-zi* "to
sprinkle"; *ḥur-na-a-iš*
"spray"
- Skt. *vāri* "water"
- Av. *vairi-* "lake"; *vār-* "to rain"
- Toch. A *wār* "water"
- Gk. οὔρον "urine"
- Lat. *ūrīna* "urine"
- OE. *wær* "spray"
- OIce. *ver* "sea"
- F. Eg. *ḥr* "to arrange, set in or-
der, array"
- IE **h₂har-* (**ar-*) "to arrange,
set in order"
- Av. *arānte* "to arrange, settle,
establish, fix"
- Skt. *ṛtú-s* "fixed time, order,
rule"; *ṛtā-s* "right, true";
ṛtī-s "way, manner"
- Arm. *arēm* "to make"
- Gk. ἀραρίσκω "to join together,
fasten, fix"
- Lat. *ars* "way, method, skill,
profession, art, occupa-
tion"
- G. PS **h₂rk* "to set in motion,
propel"
- IE **h₂harku-* (**arqu-*) "arrow, bow"
- Ar. *ḥaraka* "to move, set in
motion, propel"; *ḥarik*
"lively, active, brisk"
- Hebr. *ḥāraḥ* "to set in motion,
start"
- Goth. *arhwazna* "arrow"
- OE. *earh* "arrow"
- Lat. *arcus* "bow"
- H. PS **h₂m?* "to be sour"
- IE **h₂ham-* (**am-*, **om-*) "sour"
- Hebr. *ḥāmēš* "to be sour"
- Skt. *amlā-s* "sour, acid"
- Ar. *ḥamuḍa* "to be or become
sour"
- Gk. ὠμός "raw"
- Ug. *ḥmš* "vinegar"
- Arm. *hum* "raw"
- Amh. *homṭatṭa* "sour"
- Lat. *amārus* "bitter"
- Eg. *ḥm?* "salt"
- Beja *hami* "to be sharp, acid"

- I. PS **h₁nn* "to feel tenderness for"
 Hebr. *hānan* "to show favor, be gracious"
 Ar. *ḥanna* "to feel tenderness, affection, sympathy"
 Ug. *hnn* "to pity"
 Akk. *enēnu* "to show favor"
- IE **h₁hans-* (**ans-*) "to feel well-disposed to, kind, affectionate, favorably inclined"
 Goth. *ansts* "favor, grace"
 Gk. *πρὸς-γνῆς* "gentle, kind, soft"
- J. PS **h₁rr* "to be noble, free-born"
 Hebr. *hōr* "noble"
 Ar. *ḥurr* "noble, free-born"
 Ug. *ḥrr* "free-born"
 Eth. *ḥara*, *ḥarawi* "free man"
 Eg. *ḥry* "chief, master, overseer, superior"; *hr* "on, upon, over"; *ḥrw* "upper part"
- IE **h₁haryo-* (**aryo-s*) "free-born, noble"
 Skt. *ārya-s* "a respectable or honorable person"; *ārya-s* "master, lord"
 OIr. *aire* "nobleman"
- K. PS **h₁wk* "to weave, braid, plait"
 Ar. *ḥāka* "to weave, braid, plait"
- IE **h₁hau-* (**au-*) "to weave"
 Lith. *āusti* "to weave"
 Skt. inf. *ótum*, *ótave* "to weave"
- IE **h₁hweE-* (**wē-*) "to weave"
 Skt. *vātave* "to weave, braid, plait"; *vāna-m* "the act of weaving"
 Hitt. *ú-e-iḫ-zi* "to turn, fall"
- IE **h₁hwei-* (**wei-*) "to weave, plait, braid, twist, turn"
 Skt. *vāyati* "to weave, braid, plait"
 Lat. *vieō* "to weave together"
 Lith. *vejù* "to twist"
- IE **h₁hweb-* (**webh-*) "to weave"
 OHG. *weban* "to weave"
 Toch. B *wāp-* "to weave"
 Gk. *ὠφῆ* "a web"

L. PS **hgb* "to cover, hide, conceal"

Ar. *ḥaḡaba* "to cover, hide, conceal, obscure"

Hebr. *ḥāḡāḇ* "locust, grasshopper"

IE **h₂hag-* (**aghlu-*) "to cover, obscure; dark cloud"

Gk. ἀχλύς "mist, gloom, darkness"
OPruss. *aglo* "rain"

3.41. PS $\text{ʕ} = \text{IE } \gamma \text{ } (< \gamma^D < \text{ʕ}):$

Eg. *ʕt* "a kind of bird"

IE **yer-* (**er-*, **or-*) "bird"

Hitt. *ḫa-a-ra-aš* "eagle"

Gk. ὄρνις "bird"

Goth. *ara* "eagle"

3.42. PS $\text{h} = \text{IE } x \text{ } (< x^D < \text{h}):$

A. PS **h₂nk* "to reach, come to, arrive at, become experienced"

Ar. *ḥanaka* "to make experienced, wordly-wise, sophisticated"; *ḥunk*, *ḥink*, *ḥunka* "wordly experience, sophistication"

Hebr. *ḥānaḥ* "to train, teach, educate"

Eg. *ḥnk* "to make an offering, offer, present, be burdened"; *ḥnk*, *ḥnkt* "offerings"

IE **xenk-* (**en^hk-*) "to reach, come to, arrive at"

Hitt. *ḫi-in-ik-zi* "to present, deliver, offer, allot"

Gk. ἐνεγκεῖν "to bear, convey"

Skt. *aśnóti* "to reach, come to, arrive at, get, gain, obtain; to master, become master of; to offer"

Lat. *nancior* "to get, gain, obtain"; *nanciscor* "to obtain, get, receive, meet"

Toch. B *eñk-* "to seize, take"

Lith. *nėsti* "to carry, bear"

OCS. *nesti*, *nositi* "to carry, bear"

B. Eg. *mḥ* "cubit, forearm"

IE **mex-* (**mē-*) "to measure, mark off, measure off"

Skt. *māti* "to measure, mete out, mark off"

Lat. *mētior* "to measure"

Hitt. *me-ḫur* "time"

3.43. PS ? = IE ?:

- A. PS *ʔrʔ' "earth" IE *ʔer- (*er-) "earth"
- Hebr. 'eres "earth"
 Ar. 'ard "earth"
 Akk. irṣitu "earth"
 Ug. ʾars "earth"
 Aram. 'ar'ā "earth"
 Phoen. 'rs "land"
- Gk. ἔρᾱ "earth"
 Goth. airpa "earth"
 OHG. ero "earth"
 Welsh erw "field"
- B. PS *ʔwn "to be at rest" IE *ʔeunaA (*eunā) "resting place"
- Ar. 'āna "to be at rest";
 'aun "serenity, calmness"
 Hebr. 'ōn "vigor, wealth"
- Gk. εὐνή "the place where one beds down (usually in reference to soldiers or animals)"
- C. PS *ʔsp "to gather, harvest" IE *ʔes- (*es-en-, *os-en-) "harvest-time"
- Hebr. 'āsaq "to gather, collect, remove"; 'āsīq "harvest"
 Akk. esēpu "to gather, collect"
 Ug. ʾasp "to gather"
 Phoen. 'sp "to be gathered in"
- Eg. ʾsh "to reap; sickle"
- Goth. asans "harvest, summer"
 OHG. aran "harvest"
 OCS. jesenb "autumn"
 OPruss. assantis "autumn"
- D. PS *mʔ- "to be many; to increase" IE *meʔ- (*mē-, *mō-) "abundant, considerable"
- Hebr. mē'ōḏ "abundance"; mē'āh "hundred"
 Akk. ma'ādu "to be many; to increase"; mu'du "abundance"
 Ar. mī'a "hundred"; ma'ada "to increase, grow"
 Ug. mād "abundance"; mād "much, many"; mīt "hundred"
- OIr. mār "great"
 Osc. mais "more"
 Goth. mais "more"
- E. Eg. ʾinī "to bring, convey, fetch" IE *ʔonos- (*onos-) "brought, conveyed"
- Skt. ānas- "cart"
 Lat. onus "load, burden, freight"

- F. PS *ʔn- "to become ripe, mature"
 Ar. 'anā "to mature, become ripe"; 'anan "(span of) time, period"
 Hebr. 'ānāh "to be opportune; "to meet or encounter opportunity"

IE *ʔen- (*en-) "year"
 Gk. ἔτος "year"

3.44. PS h = IE h:

- A. PS *hy- "to kindle, excite"
 Ar. hāḡa "to kindle, ignite, inflame; to excite, stir up, agitate"; hāša "to be agitated, excited"

IE *hai- (*ai-), *haid- (*aidh-) "to kindle, light, set on fire"

Skt. indhāte "to kindle, light, set on fire"; édhas- "fuel, kindling"

Gk. αἴω "to light up, kindle; to burn, blaze"

Lat. aestās "summer"

OE. ād "fire, flame; funeral pile"

- B. PS *hrb "to liberate, free"
 Ar. haraba "to liberate, free; to flee, escape"
 Akk. arbu "fugitive, runaway"

IE *har- (*ar-) "to free, liberate"

Hitt. a-ra-wa-aḫ-ḫi "to make free"

Lyc. arawā "exempt from tax or duty"; 'Ερεῦας (*erewa-) "free(-city)"

- C. PS *hpk "to turn back, about, away; to overturn"

IE *hapo (*apo) "(turned) away, back"

Hebr. hāḡaḡ "to turn, turn back, turn about, turn away; to overturn"

Ug. hpk "to overturn"

Phoen. hpk "to overturn"

Hitt. a-ap-pa "afterwards, back, again"

Gk. ἄπο, ἀπό "off, away, back"

Skt. āpa "away, forth, back"

Goth. af "of, from, by, away from"

Lat. ab "away from"

- D. PS **h₁l* "to shine, be bright" IE **hal-bo-* (**al-bho-s*) "white; white cloud"
 Hebr. *hālāl* "to shine"
 Ar. *halla* "to shine, gleam, glow"
 Akk. *elēlu* "to be bright"; *ellu* "bright"
- E. PS **h₂wy* "to want, desire" IE **hau-* (**au-*) "to want, desire"
 Hebr. *hawāh* "desire"
 Ar. *hawīya* "to love, desire"; *hawān* "love, desire, affection, longing"
 Ug. *hwy* "to want, desire"; *hwt* "wish, desire"
 Som. *hawo* "desire, passion"
- F. Eg. *hq* "to oppress, inflict pain, diminish"; *hqs* "to defraud" IE **hak'-* (**ag-*) "to inflict pain, wrong, offend, injure"
 Skt. *āgas-* "transgression, sin, offense, injury, fault"
 Gk. *ἄγος* "curse, guilt, pollution"
 OE. *acan* "to ache"

3.45. PS γ = IE γ :

- A. PS **h₂yw/y* "to live, be alive" IE **h₂haiw-*, **h₂hayu-* (**aiw-*, **ayu-*) "to live, be alive"
 Hebr. *hāyāh* "to live"
 Ar. *hayya*, *hayīya* "to live"
 Ug. *hy* "to be alive"
 Eth. *haywa* "to heal"
 Tigre *haya* "to live"
- B. PS **?y-* "which?" IE **?yo-* (**yo-s*) "which"
 Ar. *'ayy* "which?, what?"
 Hebr. *'ay* "where?"
 Akk. *ayyu* "who?, what?"
 Ug. *iy* "where?"
 ESA *'y* "which?"
 Eth. *'ay* "which?"
- Skt. *yá-s* "which"
 Gk. *ὅς, ὃ, ὅ* "which"
 Phryg. *λος* "whoever"

- C. PS *ʔyn "to come, approach" IE *ʔei- (*ei-) "to go"
- Ar. 'āna "to come, approach" Skt. *emi* "to go"
- Eg. *iḏ* "to come" Gk. *εἶμι* "to go"
- Berb. *ayu* "to come" Lat. *eō* "to go"
- Beja *yī'*, *i'* "to come" OLith. *eĩmi* "to go"
- IE *ʔyah- (*yā-) "to go"
- Skt. *yāti* "to go, proceed"
- Hitt. *i-ya-at-ta(-ri)* "to go"
- 3.46. PS w = IE w:
- A. Eg. *wy* "I" IE *wei- (*wei-) "we"
- Hitt. *ú-i-e-eš* "we"
- Skt. *vayám* "we"
- Goth. *weis* "we"
- Luw. 1st sg. ending -*wi*
- B. PS *ʔw "or" IE *ʔwe (*-we) "or"
- Hebr. 'ō "or"
- Skt. -*vā* "or"
- Ar. 'au "or"
- Lat. -*vě* "or"
- Akk. ū "or"
- Gk. ἦ-(F)έ "or"
- Eth. 'au "or"
- Ug. ū "or"
- C. PS *wdy "to kill, destroy" IE *wed- (*wedh-) "to slay, kill"
- Ar. *wadā* "to kill, destroy"
- Skt. *vadhati* "to strike, slay, kill, destroy"
- Gk. *ἔθων* "pushing, shoving"
- Lith. *vedegà* "a type of axe"
- OPruss. *wedigo* "carpenter's axe"
- D. PS *t'wl "to become long" IE *t'eu- (*deu-, *dewə-; *dūā-, *dū-) "to make long, stretch out"
- Ar. *tāla* "to become long"
- Skt. *dū-rā-s* "far, distant"
- Hebr. *tūl* "to hurl, cast"
- Gk. (adv.) *δῆν* "long"
- Eg. *dwn* "to stretch out, extend, reach out"
- Lat. *dūrō* "to last, continue"
- Saho *ḍel* "to be long"
- Hitt. *tu-u-wa* "to a distance, afar"

- E. PS **wai* "woe!, shame!" IE **wai* (**wai*) "woe!"
 Ar. *wai* "woe!, shame!" Lat. *vae* "alas!, woe!"
 Har. *wāy* "woe!, misery!" Arm. *vay* "woe!"
 Ug. *w-* "woe!" Goth. *wai* "woe!"
 Akk. *ai* "woe!"
 Eg. *wy* "woe!"
- F. Eg. *wrš* "to watch, observe"; IE **wer-* (**wer-*) "to guard,
wršt "watch, vigil"; *wrh*
 "to guard, protect" watch"
 Goth. *wardja* "guard"
 OE. *warian* "to beware, warn,
 guard"; *wær* "cautious,
 wary"
 OHG. *wartēn* "to guard, watch"
 Lett. *vērt* "to look at, notice"
 Lat. *vereor* "to be afraid, be
 anxious"
 Hitt. *ú-e-ri-te-ma-aš* "anxiety"
- 3.47. PS *m* = IE *m*:
- A. Eg. *m* "to reap, harvest" IE **me?*- (**mē-*) "to mow, reap"
 Gk. *ἀμῶω* "to reap"
 OE. *māwan* "to mow"
- B. Eg. *mtt* "middle"; *mtw* "with" IE **met-* (**met-*) "with, among"
 Gk. *μετὰ* "in the midst of, among"
 Alb. *mjet* "middle"
 Goth. *miþ* "with, among"
 Av. *mat* "with"
- C. PS **mll* "to wear away" IE **mel-* (**mel-*) "to wear away"
 Hebr. *mālāl* "to rub, scrape"
 Ar. *malā* "to become tired,
 weary, bored"
 Hitt. *ma-al-la-i* "to grind"
 Skt. *mṛāṭi* "to crush, grind";
mṛdū-s "soft, tender, mild"
 Gk. *ἀμαλδύνω* "to soften"; *μαλακός*
 "soft"
 Lat. *molō* "to grind"; *mollis*
 "soft, tender, mild, weak"
 Goth. *malan* "to grind"
 Lith. *malù* "to grind"

- D. PS **mny* "to divide, portion out, count" IE **men-* (**men-*) "to think, reflect, remember"
- Hebr. *mānāh* "to count, reckon; part, portion"
 Skt. *mānyate* "to think, reflect"
 Gk. μνηστω "to remember"
 Akk. *manū* "to count, reckon" Goth. *munan* "to think"
 Ar. *manā* "to assign, apportion" Lith. *miniū* "to think of, remember"
 Ug. *mnt* "part, portion" Lat. *meminī* "to remember"; *moneō* "to remind"; *mēns* "mind"
- E. PS **mn̥* "to detain, hold back" IE **men-* (**men-*) "to stay, remain"
- Hebr. *māna* "to withhold, hold back"
 Gk. μένω "to stay, remain"
 Ar. *mana* "to stop, detain" Lat. *maneō* "to stay, remain"
 Av. *man-* "to remain"
 Eg. *mn* "to remain"
 Galla *manā* "house"
- F. PS **mr̥* "to be manly, virile" IE **mer-yo-* (**mer-yo-*) "young man"
- Ar. *maru* "to be manly"; *marī* "manly, virile"
 Skt. *mārya-s* "young man"
 Ug. *mr* "master" Gk. μείραξ "lad"
 Aram. *mārē* "lord"
 Akk. *māru* "son"
- G. PS **mā* "not" IE **mē* (**mē*) "not"
- Ar. *mā* "not"
 Skt. *mā* "not"
 Eg. *m* "not" Gk. μή "not"
 Arm. *mī* "not"
 Toch. A *mā* "not"
- H. PS **mr̥* "to be sick" IE **mer-* (**mer-*) "to die"
- Ar. *marīḍa* "to fall ill, be sick"
 Skt. *mārate* "to die"
 Ug. *mr̥* "to be sick" Hitt. *mī-ir-zi* "to die"
 Akk. *marāsu* "to be sick" Lat. *moriōr* "to die"
 Hebr. *mārāṣ* "to be sick" Lith. *mir̥ti* "to die"
- Eg. *mr* "to be sick, suffer pain; to die; dead; death"; *mrt* "sickness, illness, fatal disease"

- I. PS **mtʻ*- "to expand, stretch" IE **metʻ*- (**med-*) "to measure"
- Ar. *maṭṭa* "to expand, stretch, lengthen"; *maṭāla* "to expand, draw out, lengthen, stretch"
- Goth. *mitan* "to measure"
Gk. *μέδομαι* "to provide for, be mindful of"
Lat. *meditor* "to consider"
- J. PS **mlʻ* "to fill, be full" IE **mel-* (**mel-*) "to be full; much, many"
- Hebr. *mālēʻ* "to fill, be full"
Ar. *maḷaʻa* "to fill, become filled, be full"
Akk. *maḷū* "to fill, be full"
Ug. *mḷā* "to fill, become filled"
Har. *mālaʻa* "to fill, fulfill"
- Lat. *multus* "many"
Gk. *μᾶλα* "very, very much"; *μᾶλλον* "more"
Lett. *mīlns* "very much"
- IE **melg-* (**melǵh-*) "to make full, become filled"
- Skt. *malhā-s* "having teats in the dewlap"
Arm. *małj* "gall, bile"
Lett. *melzu* "to swell, fester"
- K. Eg. *ḫmm* "to seize, grasp" IE **ʔem-* (**em-*) "to take, obtain"
- Beja *amit*, *amid* "to seize"
Hausa *am* "to seize"
- Lat. *emō* "to buy, purchase"
Lith. *imū* "to take"
- L. PS **mw-* "water" IE **meu-* (**meu-*) "to flow, be wet, damp, moist"
- Hebr. *mayim* "waters"
Akk. *mū* "water"
Ug. *my* "water"
Ar. *māʻ* "water"
Eth. *may* "water"
- Skt. *mūtra-m* "urine"
Mir. *mūn* "urine"
Lith. *māudyti* "to bathe"
Gk. *μυδάω* "to be damp, clammy"; *μύρω* "to flow"
- Eg. *mw* "water"; *mwj* "to flow, be watery"; *mwyt* "urine"
- M. PS **mrw* "to anoint, rub with fat or oil" IE **(s)mer-* (**[s]mer-*) "to smear, anoint, rub with fat or oil"
- Hebr. *māraḥ* "to rub"
Ar. *marāḥa* "to oil, anoint, rub"
Ug. *mrḥ* "to spread over"
Akk. *marāḫu* "to rub"
- Gk. *μυρίζω* "to anoint, rub with ointment"; *μύρον* "ointment"
Welsh *mer* "marrow"
OE. *smierwan* "to anoint"; *smearu* "grease, fat"

PS **mr̥* "to rub, anoint"

Ar. *marāʿa* "to rub, anoint"

Eg. *mr̥h* "to anoint, rub with fat or oil"

N. Eg. *mr* "any body of water: lake, pool, cistern, reservoir, flood, stream, basin, canal"; *mr* "swampy land"

IE **morī-* (**morī-*) "body of water; lake, sea"

Lat. *mare* "sea"
Goth. *marei* "sea"
Lith. *mārė* "sea"
OIr. *muir* "sea"
OSax. *mōr* "marsh"

O. Eg. *mr* "to bind up, tie together"

IE **mer-* (**mer-*) "to bind, tie together"

Gk. μέρυς "cord, string, rope"
OIce. *merð* "fish-trap"

3.48. PS *n* = IE *n*:

A. PS **hny* "to bend, curve"

Hebr. *hānāh* "to decline, bend down"

Ar. *hanā* "to bend, curve, twist, turn"

IE **h̥hank-* (**anq-*) "to bend, curve"

Skt. *āñcati* "to bend, curve"
Gk. ἀγκών "curve, bend, elbow"
Lat. *ancus* "a person with a crook-elbow"

IE **h̥hankʷ-* (**ang-*) "to bend, curve"

Skt. *āṅga-m* "limb"; *āṅgūri-s* "finger"
Lat. *angulus* "corner, angle"
OE. *anclēow* "ankle"

B. PS **?n-* "in, on, from, by"

Akk. *ina* "in, on, from, by"

IE **?en-* (**en-*) "in"

Lat. *in* "in, into"
Gk. ἐν, ἐνυ, ἐνύ "in"
Goth. *in* "in"

- C. PS **nky* "to strike, smite" IE **nek-* (**neĕ-*) "to slay, smite"
- Hebr. *nāḫāh* "to strike, smite"
 Ar. *nakā* "to cause damage, harm; to hurt, injure"
 Ug. *nkt* "victim"
 Eth. *nakaya* "to hurt"
- Lat. *necō* "to kill, slay"
 Skt. *násyati* "to be lost, perish, disappear"
 Gk. *νέκυσ* "dead body, corpse"
 OIr. *éc* "death"
- Eg. *nk* "to smite, attack, injure"
- D. PS **ʔan-ā(ku)* "I"; **naḥ-nu* "we" IE **ʔno-s*, **ʔns* (**no-s*, **ns*) "us"
- Sg. Pl. Skt. du. *nau*, pl. *nas* "us"
 Gk. du. *νώ* "us"
 Lat. *nōs* "we, us"
 Goth. *uns* "us"
 Hitt. *an-za-a-aš* "us"
- Hebr. *ʔānī* (*ʔa*)*naḥnū*
 'ānōḫī
 Ar. *ʔanā* *naḥnu*
 Akk. *anāku* *nīnu*
 Ug. *ānk*
 Eth. *ʔana* *nəḥna*
- Eg. *īnk* *īnn*
- E. Eg. *nr* "to be strong, mighty";
nrw "strength, power, victory, valor; mighty one" IE **ner-* (**ner-*) "man"
- Skt. *nár-* "man"; *nárya-s* "manly, strong"
 Gk. *άνήρ* "man"
 Alb. *njer* "man"
 Welsh *ner* "hero"
 OIr. *nert* "strength"
- F. Eg. *nd*, *ndd* "to tie, bind" IE **net'-* (**ned-*) "to tie or bind together"
- Lat. *nōdus* "knot"
 OE. *nett* "net"
 OIr. *nascim* "to bind"; *naiḏm* "binding, surety"

- A. PS **l̥k'*- "to gather, collect" IE **lek'*- (**leĝ-*) "to gather"
 Hebr. *lāqat* "to gather, pick up, gather up"
 Lat. *legō* "to ordain, appoint"
 Akk. *laqātu* "to collect, gather" (cf. fn. 17)
 Gk. λέγω "to pick, gather, speak"
 Ar. *laqata* "to gather, pick up, collect"; *laqina* "to gather, infer, teach"
- B. PS **l̥w-* "to stain, tarnish, soil" IE **leu-* (**leu-*, **lewe-*, **l̥ū-*) "dirt"
 Ar. *lāta* "to stain, tarnish, soil"; *lauta* "stain, blot, spot"
 Gk. λῦμα "dirt (removed by washing), filth"
 Akk. *lu'ū* "to soil, dirty";
 Lat. *lutum* "mud, mire, dirt"
lūtu, *lu'tu* "dirt"
 OIr. *loth* "dirt, filth"
- C. PS **l̥wh-* "to shine, gleam; to show, appear" IE **leuk-* (**leuq-*) "to shine, be bright"
 Ar. *lāha* "to appear, show, shine, come into sight"
 Skt. *rōcate* "to shine, be bright"
 Ug. *lh-* "to shine, gleam, glimmer"
 Gk. λευκός "bright, white"; λεύσσω "to gaze, look at, see"
 Lat. *lūceō* "to shine"
 Goth. *liuhab* "light"
 OE. *lēoht* "light"

3.50. PS *r* = IE *r*:

- A. PS **rk'b* "to observe, watch, supervise, control" IE **rek'*- (**reĝ-*) "to guide, rule, direct, control"
 Ar. *raqaba* "to observe, watch, supervise, control"
 Lat. *regō* "to guide, direct"
 Gk. ὁρέγω "to reach out"
 Goth. *raihts* "right"
 Skt. *rjū-s* "straight, upright, right"
- B. PS **rks* "to bind" IE **rek-* (**reġ-*) "to bind"
 Hebr. *rāḫas* "to bind"
 Skt. *raśanā* "rope, cord"
 Akk. *rakāsu* "to bind"
 Ug. *rks* "to bind"

- C. PS **ḥrtš* "to plow" IE **ḥhar-* (**ar[ə]-*) "to plow"
- Hebr. *ḥāraš* "to plow"
 Ar. *ḥarata* "to plow"
 Ug. *ḥrt* "to plow"
 Har. *ḥarāsa* "to plow"
 Akk. *erēšu* "to plow, till"
- Hitt. *ḥar-aš-zi* "to plow"
 Lat. *arō* "to plow"
 Gk. *ἀρώ* "to plow"
 Goth. *arjan* "to plow"
- D. PS **ʔrx* "to hasten, go" IE **ʔer-* (**er-*, **or-*) "to go, come, set in motion"
- Hebr. *ʾāraḥ* "to go, wander, journey"
 Akk. *arāhu* "to hasten, hurry";
urhu "road, path"
- Hitt. *a-ri* "to arrive, come";
a-ar-aš-ki-iz-zi "to arrive"
 Skt. *racḥāti* "to go, send"; *ṛmōti* "to arise, move"
 Lat. *orior* "to arise"
 Gk. *ὀρῶμι* "to stir up"

3.51. Notes on Morphology:

Both Semitic and Indo-European make use of syntactic cases, reduplication, prefixes, infixes, and suffixes, and vowel gradation. As noted by Meillet (1964:153-4), in both Semitic and Indo-European, the consonants carry the basic meaning of a stem, while the vowels determine morphological function. However, Kurylowicz (1962:13-4) has clearly demonstrated that the details of the Semitic and Indo-European systems of vowel gradation differed greatly. We saw earlier (§1.6) how the Indo-European system was influenced by accentuation.

The vast majority of Semitic roots are composed of three consonants. However, as Moscati (1964:72-5) points out, this may very well be an innovation. Since there is not such a preponderance of triconsonantal roots in the other Afroasiatic languages, it seems likely that Semitic has expanded this type of root at the expense of roots with other than three consonants. According to Benveniste (1935:170-1), the overwhelming majority of Indo-European roots were biconsonantal. These biconsonantal roots could be expanded by the addition of suffixes, to which determinatives and infixes could then be added.

Both Indo-European and Semitic have constraints on root structure sequences. Hopper (1973:§3.2.6) has restated the Indo-European con-

straint laws thus:

1. Each root contains at least one [-checked] obstruent.
2. When both obstruents are [-checked], they must agree in voicing.

The Indo-European root structure constraint laws thus become simply a voicing agreement rule with the corollary that two glottalics cannot co-occur in a root¹⁷. According to Moscati (1964:74-5), Semitic does not permit identical consonants or consonants with the same point of articulation as the first and second consonants in a root.

The following suffixes appear to have similar functions in both Semitic and Indo-European:

1. *y*-suffixes forming adjectives indicating "belonging to" (this same suffix is also used to form the genitive case in the Semitic languages);
2. *t*-suffixes forming abstracts;
3. *m*-suffixes forming adjectives;
4. *n*-suffixes forming both abstracts and adjectives.

4. PREHISTORY OF INDO-EUROPEAN:

4.1. *Pre-Indo-European*:

Now that we have completed comparing the Proto-Indo-European and Proto-Semitic phonological systems and vocabularies, we are in a posi-

¹⁷In Akkadian, "von zwei emphatischen Konsonanten, die in anderen semitischen Sprachen in einem Worte begegnen können, wird...einer dissimiliert, und zwar: $t - q/\text{š} > t - q/\text{š}$; $q - \text{š} > k - \text{š}$; $q - \text{t} > q - t$ (sog. Geers'sche Regel)..."(cf. Ungnad-Matouš 1969:27). Not only does this provide a neat parallel to the Indo-European constraints, but also it is further evidence that the emphatics were ejectives in Akkadian.

tion to trace the prehistoric development of the Proto-Indo-European phonological system. We shall begin with pre-Indo-European.

The earliest form of pre-Indo-European that can be reconstructed most likely had the following phonemic inventory:

Stops and Affricates:

Voiceless:	p	t	<u>ts</u>	<u>tʃ</u>	<u>tʰ</u>	k	kʷ	(q)	(qʷ)	
Voiced:	b	d	<u>dz</u>	<u>dʒ</u>		g	gʷ	(g)	(gʷ)	
Glottalized:		tʼ	<u>tsʼ</u>	<u>tʃʼ</u>	<u>tʰʼ</u>	kʼ	kʷʼ	(qʼ)	(qʷʼ)	?

Fricatives:

Voiceless:		s	ʃ		h̥	h
Voiced:					ʃ	

Resonants:

Nasals:	m	n
Rolled:		r
Lateral:		l
Glides:	w	y

Vowels:	a	i	u
	ā	ī	ū

Notes:

The voiceless stops and affricates can have nonphonemic aspirated variants.

The earliest change that took place must have been the development of the voiceless and glottalized lateralized affricates into velar stops along the lines suggested by Trubetzkoy (cf. §3.9 and Steiner 1977:40):

$\ast \underset{\sim}{t} \underset{\sim}{d}$ >	$\ast \underset{\sim}{k} \underset{\sim}{d}$ >	$\ast \underset{\sim}{k} \underset{\sim}{x}$ >	k
voiceless	voiceless	voiceless	voiceless
alveolar	velar	velar	velar
lateralized	lateralized	affricate	stop
affricate	affricate		
$\ast \underset{\sim}{t} \underset{\sim}{d}'$	$\ast \underset{\sim}{k} \underset{\sim}{d}'$	$\ast \underset{\sim}{k} \underset{\sim}{x}'$	k'
glottalized	glottalized	glottalized	glottalized
alveolar	velar	velar	velar
lateralized	lateralized	affricate	stop
affricate	affricate		

The final change that can be assigned to pre-Indo-European was the loss of the dental affricates through merger with the palato-alveolar affricates:

$\underset{\sim}{t} \underset{\sim}{s}$ >	$\underset{\sim}{t} \underset{\sim}{ʃ}$
$\underset{\sim}{d} \underset{\sim}{z}$ >	$\underset{\sim}{d} \underset{\sim}{ʒ}$
$\underset{\sim}{t} \underset{\sim}{s}'$ >	$\underset{\sim}{t} \underset{\sim}{ʃ}'$

4.2. *Stress Indo-European:*

Pre-Indo-European was followed by the phonemic stress stage of Indo-European, which is the earliest stage of Indo-European proper that can be recovered. This stage was characterized by the phonemicization of a strong stress accent that caused the reduction and elimination of unaccented vowels. This change was the first in a long series of changes that brought about the grammaticalization of what began as a phonological alternation, totally obliterating the earlier, pre-Indo-European patterning -- whatever that may have been -- and which maintained vitality throughout the long, slowly-changing prehistory of the Indo-European parent language itself and even into the early stages of some of the daughter languages. Whether or not this series of changes was influenced by or itself influenced the patterning developing in neighboring languages cannot yet be ascertained with absolute certainty.

What is certain, though, is that the parallels between the systems of vowel gradation found in Indo-European and some of the Caucasian languages, especially the Kartvelian languages, are so close (cf. Colarusso this volume; Gamkrelidze 1967:707f) that coincidence can be all but ruled out. What needs to be determined still is the exact nature, extent, and direction of any influence that may have occurred.

It was probably during the phonemic stress stage of Indo-European that the syllabic resonants came into being. This was also the stage in which some pharyngeal fricatives developed into velar fricatives on the one hand and into uvular stops on the other. It is not possible, however, to state the exact conditions under which these latter changes would have occurred. All that can be said -- and not even this with certainty -- is that they did take place.

Stress Indo-European phonemic system:

Stops and Affricates:

Voiceless:	p	t	$\underset{\sim}{t}^{\text{ʃ}}$	k	k ^w	(q)	(q ^w)	
Voiced:	b	d	$\underset{\sim}{d}^{\text{ʒ}}$	g	g ^w	(g)	(g ^w)	
Glottalized:		t'	$\underset{\sim}{t}^{\text{ʃ}'}$	k'	k' ^w	(q')	(q' ^w)	?

Fricatives:

Voiceless:	s	ʃ	x		ħ	h
Voiced:			ɣ		ʕ	

Resonants:

Nasals:	m/ṃ	n/ṇ
Rolled:		r/ṛ
Lateral:		l/ḷ
Glides:	w/u	y/i

Vowels:	a	i	u
	ā	ī	ū

Phonemic analysis:

- A. Stops, affricates, and fricatives: always nonsyllabic.
- B. Resonants: syllabicity determined by surroundings: syllabic when between two nonsyllabics and nonsyllabic when either preceded or followed by a vowel.
- C. Vowels: always syllabic.

Suprasegmentals:

- A. Stress: applied only to vowels: distribution correlated with grammatical categorization.
- B. Pitch: nondistinctive.

4.3. *Pitch Indo-European:*

Pitch Indo-European phonemic system:

Stops:

Voiceless:	p	t	k	k ^w	
Voiced:	b	d	g	g ^w	
Glottalized:		t'	k'	k' ^w	ʔ

Fricatives:

Voiceless:	s	x	ħh	h
Voiced:		ɣ	ʕh	

Resonants:

Nasals:	m/ṃ	n/ṇ
Rolled:		r/ṛ
Lateral:		l/ḷ
Glides:	w/u	y/i

Vowels:

a	i	u
ā	ī	ū

Phonemic analysis: unchanged.

Suprasegmentals:

- A. Stress: nondistinctive.
- B. Pitch: distribution morphologically-conditioned: high pitch is applied to morphologically-distinctive vowels, and low pitch is applied to morphologically-nondistinctive vowels.

Notes:

- A. The vowels *a* and *ā* have front allophones under high pitch and back allophones under low pitch.
- B. The palato-alveolar affricates are eliminated through occlusivization and merger with the dental stops. At the same time, the palato-alveolar sibilant merges with the dental sibilant:

$\underset{v}{t\text{ʃ}}$	>	t
$\underset{v}{d\text{ʒ}}$	>	d
$\underset{v}{t\text{ʃ}'}$	>	t'
$\underset{v}{\text{ʃ}}$	>	s

- C. The plain uvulars merge with the plain velars, and the labialized uvulars merge with the labialized velars:

q	>	k	q ^w	>	k ^w
g	>	g	g ^w	>	g ^w
q'	>	k'	q' ^w	>	k' ^w

- D. The pharyngeal fricatives develop into pharyngeal/laryngeal fricatives:

ħ	>	h̥
ʕ	>	ʕ̥

It was probably at the end of the phonemic pitch stage of Indo-European that the Anatolian languages became separated from the main speech community. Proto-Anatolian cannot be derived from either Late Indo-European or Disintegrating Indo-European because changes took place during these periods that are not found in the Anatolian languages:

- A. There is no evidence at all to my mind that Proto-Anatolian had *o*-grade vowels (cf. Bomhard 1976:§7.3). In every instance where the evidence of the non-Anatolian daughter languages points to an *o* in the parent language, the Anatolian languages have *a*. Therefore, the Anatolian languages must have become separated from the main speech community before the appearance of *o*-grade vowels. *o*-grade vowels became phonemic in Late Indo-European.
- B. Another change that took place in Late Indo-European but that is not found in the Anatolian languages is the palatalization of velars when next to *ĩ*, *ẽ*, and apophonic *o* and before *y*.
- C. According to Winter (1965b:191f), the sequences *Hu* and *Hĩ* became *uH* and *ĩH* respectively when followed by a nonsyllabic. This metathesis accounts for the fact that the weak-grades of *eHu* and *eHĩ* are *ũ* and *ĩ* respectively in Disintegrating Indo-European. Once the metathesis had taken place in the weak-grade forms, they served as the basis for new full-grade forms. Metathesized and unmetathesized forms are often found side by side in the various daughter languages. A good example is the word for "fire", which has unmetathesized derivatives in Hittite, Tocharian A, and Gothic and metathesized derivatives elsewhere, except for OHG. *fiur*, which points to a Disintegrating IE **peuHrĩ* with secondary full-grade. The Anatolian languages show no trace of laryngeal metathesis.
- D. Finally, the Anatolian languages are isolated in preserving reflexes of several of the laryngeals. The non-Anatolian daughter languages show no trace of laryngeals either initially (except Armenian) or medially. However, the former presence of medial laryngeals is indicated by the fact that they caused the lengthening of preceding short vowels when lost immediately after these vowels and before an immediately following nonsyllabic. This development is found in all of the non-Anatolian daughter languages without exception, clearly pointing to a common innovation in their Indo-European antecedent that is not found in the Anatolian languages.

4.4. *Late Indo-European:*

Late Indo-European phonemic system:

Stops:

Voiceless:	p	t	k	k ^w	
Voiced:	b	d	g	g ^w	
Glottalized:		t'	k'	k' ^w	?

Fricatives:

Voiceless:	s	x	ɸ	h
Voiced:		ɣ	ʕ	

Resonants:

Nasals:	m/ṃ	n/ṇ	
Rolled:		r/ṛ	
Lateral:		l/ḷ	
Glides:	w/u	y/i	

Vowels:	e	o	a	i	u
	ē	ō	ā	ī	ū

Phonemic analysis: unchanged.

Suprasegmentals:

- A. Stress: nondistinctive.
- B. Pitch: distribution partially correlated with vowel gradation.

Notes:

- A. Vowel quality replaces accentuation as the primary internal grammatical morpheme as the front and back allophones

of a and \bar{a} became phonemic:

\acute{a}	>	e ; a (when next to \mathfrak{z}_2 and \mathfrak{z}_4)
\grave{a}	>	o
$\acute{\bar{a}}$	>	\bar{e} ; \bar{a} (when next to \mathfrak{z}_2 and \mathfrak{z}_4)
$\grave{\bar{a}}$	>	\bar{o}

- B. g , k , and k' develop palatalized allophones when contiguous with front vowels and apophonic o as well as before y .
- C. ? , h , x , and γ are lost initially before vowels, while $\text{?}h > h$ and $\text{?}h > h$ in the same environment.

4.5. *Disintegrating Indo-European:*

It is reasonably certain that the form of Indo-European spoken immediately prior to the emergence of the historically-attested non-Anatolian daughter languages was not a unitary language but, rather, a speech area composed of several closely-related dialect groups (cf. Burrow 1973:12f and Georgiev 1966:382f, for example).

The following changes are common to all of the Disintegrating Indo-European dialects (except where noted):

- A. All laryngeals merge into $/h/$.
- B. $/h/$ (from earlier $/hh/$ and $/\text{?}h/$) is then lost initially before vowels (except in pre-Proto-Armenian) and medially between an immediately preceding vowel and an immediately following nonsyllabic. This latter change causes the compensatory lengthening of preceding short vowels:

iHC	>	$\bar{i}C$
eHC	>	$\bar{e}C$
aHC	>	$\bar{a}C$
oHC	>	$\bar{o}C$
uHC	>	$\bar{u}C$

- C. The single remaining laryngeal, /h/, is preserved in all other positions. /h/ has a vocalic allophone (/ɸ/) when between two nonsyllabics. This vocalic allophone is the traditional schwa primum.

In a central, innovating dialect area, the labialized velars become (perhaps only partially at first) delabialized and merge with the unpalatalized allophones of the velars. This change brings about the phonemicization of the palatalized velars:

k	—	k ^w	k'	—	k' ^w	g	—	g ^w
↓	↘	↓	↓	↘	↓	↓	↘	↓
c	—	k	c'	—	k'	ɟ	—	g

This change probably began in the ancestor of what became Indo-Iranian and spread outward to pre-Baltic, pre-Slavic, pre-Armenian, and pre-Albanian (cf. Szemerényi 1972:129). The fact that the various satem dialects sometimes show a different treatment for the labialized velars as opposed to the plain velars seems to indicate that the delabialization of the labialized velars may not have been carried through to completion until well after the emergence of the individual daughter languages (cf. Szemerényi 1972:128).

The phonemic system of the Central Dialects of Disintegrating Indo-European may thus be reconstructed as follows:

Stops:

Voiceless:	p	t	c	k	(k ^w)
Voiced:	b	d	ɟ	g	(g ^w)
Glottalized:	(p')	t'	c'	k'	(k' ^w)

Fricative:

Voiceless:	s
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Resonants:

Nasals:	m/ṃ	n/ṇ
Rolled:		r/ṛ
Lateral:		l/ḷ
Glides:	w/u	y/i

Vowels:	e	o	a	i	u
	ē	ō	ā	ī	ū

Laryngeal:	h/ḥ
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Phonemic Analysis: unchanged.

Suprasegmentals:

- A. Stress: nondistinctive
- B. Pitch: distribution is partially correlated with vowel gradation except in pre-Balto-Slavic, where the distribution is correlated with vowel length (cf. Bomhard 1979:§22 and Shevelov 1964:38-80 and 532-81 for a discussion of the development of accentuation in Slavic).
- C. Quantity: open syllables ending in a short vowel are metrically short, while open syllables ending in a long vowel and closed syllables are metrically long (cf. Lehmann 1952:§2.4).

The most significant difference between the phonemic systems of the Central (*satem*) Dialects and the non-Central (*centum*) Dialects of Disintegrating Indo-European was in the treatment of the plain and labialized velars. In the non-Central Dialects, the labialized velars did not become delabialized, and the palatalized allophones of the plain velars remained subphonemic.

A widespread development was the change of the glottalics into plain voiced stops. In section 1.4, I postulated the following progression: glottalized → creaky voice → full voice:

$$p' \quad t' \quad k' \quad k' \rightarrow \underset{\sim}{b} \quad \underset{\sim}{d} \quad \underset{\sim}{g} \quad \underset{\sim}{g}^w \rightarrow b \quad d \quad g \quad g^w$$

In actual fact, this may be only one of the means by which the glottalics became voiced stops. According to Martinet (1970:§4.28), ejectives can develop first into implosives by a progressive anticipation of the voice of a following vowel. These implosives are then deglottalized, leaving plain voiced stops as the result:

$$p' \quad t' \quad k' \quad k'^w \rightarrow 'b \quad 'd \quad 'g \quad 'g^w \rightarrow b \quad d \quad g \quad g^w$$

In pre-Baltic, pre-Slavic, pre-Celtic, and pre-Albanian, the glottalics may be assumed to have passed through the former progression on their way to becoming plain voiced stops. In pre-Greek, pre-Italic, and pre-Indo-Iranian, the glottalics may be assumed to have first become implosives.

In pre-Greek, pre-Italic, and pre-Indo-Iranian, the voiceless aspirates became phonemic, and the plain voiced stops became voiced aspirates. I follow Gamkrelidze (1976:404), however, in his reinterpretation of Grassmann's Law as a rule of allophonic alternation between aspirates and nonaspirates dating to this period (i.e., late Disintegrating Indo-European) and not a parallel development arising independently in Greek on the one hand and Indo-Iranian on the other. The earliest pre-Greek consonant system may be reconstructed as follows:

p	t	k	k ^w
p ^h	t ^h	k ^h	k ^w h
b	d	g	g ^w
b ^h	d ^h	g ^h	g ^w h
'b	'd	'g	'g ^w

Such a system has a typological parallel in Sindhi (cf. Ruhlen 1976: 268). For pre-Indo-Iranian, the earliest consonant system may have been as follows:

p	t	c	k
p ^h	t ^h	c ^h	k ^h
b	d	ɟ	g
b ^h	d ^h	ɟ ^h	g ^h
'b	'd	'ɟ	'g

With the deglottalization of the implosives and their merger with the unaspirated allophones of the voiced (aspirated) stops, we arrive at a phonological system for the late Disintegrating Indo-European antecedent of Indo-Iranian that is nearly identical to what was reconstructed for Indo-European by the Neogrammarians.

4.6. *Development of the Consonants in the Daughter Languages:*

- A. Tocharian: The plain voiced stops are devoiced, and the glottalized stops are deglottalized (cf. Bomhard 1979:§17):

p	b	(p')	>	p (w)
t	d	t'	>	t (c, ts)
k	g	k'	>	k (ç)
k ^w	g ^w	k' ^w	>	kw/u (k, ç)

- B. Germanic: The voiceless stops become voiceless fricatives. Then, medial (and final) *f*, *θ*, *χ*, *χ^w*, together with *s*, become *β*, *ð*, *γ*, *γ^w*, and *z* respectively except (1) before *s* or *t* and (2) between vowels when the accent falls on the contiguous preceding syllable (Verner's Law). The glottalized stops become deglottalized, and the voiced stops develop fricative allophones. Cf. Bomhard 1979: §13; see also Normier 1977.

p	t	k	k ^w	>	f	θ	χ	χ ^w
b	d	g	g ^w	>	b/β	d/ð	g/γ	g ^w /γ ^w
(p')	t'	k'	k' ^w	>	(p)	t	k	k ^w

- C. Armenian: The voiceless aspirates become phonemic, and the glottalics are deglottalized (cf. Bomhard 1979:§12):

p	t	c	k	>	h (w, Ø), t', s, k'
p ^h	t ^h	k ^h		>	p', t', x
t'	c'	k'		>	t, c, k
b	d	ɟ	g	>	b (w), d, j (z), g (j, ž)

It should be noted that the last series may have been voiced aspirated in Classical Armenian and that this pronunciation is currently found in some modern eastern dialects. Moreover, the third series is glottalized in some modern eastern dialects.

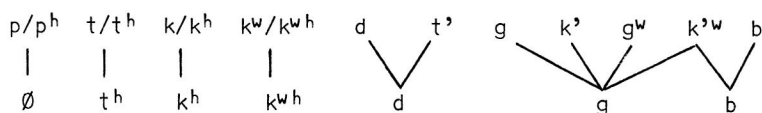
- D. Greek: The voiced aspirated allophones become voiceless aspirates, merging with the already existing voiceless aspirates, and the plain voiced allophones are devoiced and merge with the plain voiceless stops. The implosives then become plain voiced stops. Cf. Bomhard 1979:§16; Hopper 1973:§3.3.2.

p	t	k	k ^w	}	p	t	k	k ^w
b	d	g	g ^w					
p ^h	t ^h	k ^h	k ^{w h}	}	p ^h	t ^h	k ^h	k ^{w h}
b ^h	d ^h	g ^h	g ^{w h}					
'b	'd	'g	'g ^w	>	b	d	g	g ^w

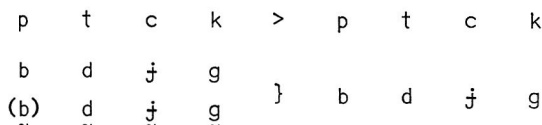
- E. Italic: The voiced aspirates merge with the voiceless aspirates and then develop into the voiceless fricatives *f*, *θ*, *χ*, and *χ^w*. The implosives become plain voiced stops. Cf. Bomhard 1979:§14.

p	t	k	k ^w	>	p	t	k	k ^w
p ^h	t ^h	k ^h	k ^{w h}	}	p ^h	t ^h	k ^h	k ^{w h}
b ^h	d ^h	g ^h	g ^{w h}					
'b	'd	'g	'g ^w	>	b	d	g	g ^w

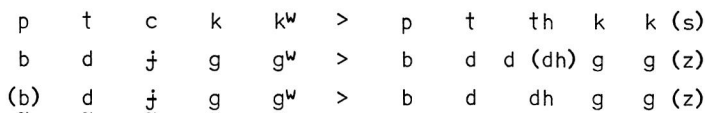
- F. Celtic: The glottalized dental and velar stops merge with their plain voiced counterparts. $k^{hw} > g^{hw} > b$ initially and medially after consonants but g elsewhere (cf. Bomhard 1979:§14):



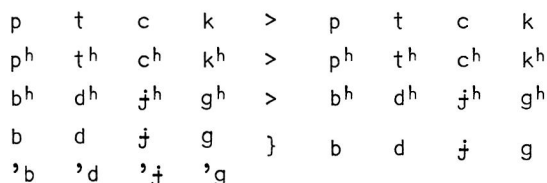
- G. Balto-Slavic: The plain voiceless stops remain, but the glottalized stops merge with the plain voiced stops. $k^h > x$ in Slavic. Cf. Bomhard 1979:§10 and §11; Shevelov 1964.



- H. Albanian: The labialized velars are distinguished from the plain velars before original \tilde{e} and \tilde{z} .



- I. Indo-Iranian: The implosives merge with the plain voiced stops. This system remains intact in Indo-Aryan, while in Iranian the plain and aspirated voiced stops merge. Cf. Bomhard 1979:§9; Hopper 1973:§3.3.4.



5. CONCLUDING REMARKS:

The similarities between Indo-European and Afroasiatic are so numerous that the possibility of common genetic origin can no longer be dismissed -- in fact, the data presented in this study compel us to dismiss any other possibility. That is not to say that all questions have been answered, for they have not. The present paper is merely a beginning, a foundation on which to build. There are whole areas (root structure, vocalic patterning, and morphology, for example) that must yet be explored. In due time, these areas will be investigated, and before long the common origin of these two great language families will be an accepted fact.

Wider horizons await us. We cannot assume that our work is done once we have finally proven that Indo-European and Afroasiatic are in fact genetically related. We must consider further relationship to other language families -- a group of gifted Soviet linguists (Dybo, Illič-Svityč, Dolgopoli'skij) has already led the way. Holger Pedersen's theory setting up a great "Nostratic" macrofamily (redefined by Birnbaum [1977:51] to include Indo-European, Afroasiatic, Kartvelian, Uralic, and Altaic), first proposed in 1903 and long looked upon as little more than the fanciful dream of a brilliant mind, is finally on its way to being provable if not yet proven.

* * *

AFTERWORD

There are still those who are opposed to using typological data either to verify the naturalness of our reconstructions or to uncover lost details by means of implicational universals. I think that they are in error. We should not hesitate to use every means at our disposal to help us arrive at realistic reconstructions. That every language that ever was spoken or that ever will be spoken by humankind cannot be included in the typological sample does not invalidate the procedure: it merely means that the typological data must be used judiciously and that our reconstructions can only be tentative.

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